Sun StorEdge™ 3000 Family Installation, Operation, and Service Manual

Sun StorEdge 3310 SCSI Array

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Preface

This manual gives step-by-step procedures for installing and initially configuring the Sun StorEdge™ 3310 SCSI array.

Caution – You should read the *Sun StorEdge 3000 Family Safety, Regulatory, and Compliance Manual* for your array before beginning any procedure in this manual.

How This Book Is Organized

This book covers the following topics:

Chapter 1 provides an overview of RAID features.

Chapter 2 covers the site planning and basic safety requirements.

Chapter 3 provides general procedures for unpacking and inspecting the array.

Chapter 4 provides procedures for cabling and for connecting to power and to the network.

Chapter 5 provides procedures for a first-time configuration.

Chapter 6 describes the front and rear panel LEDs.

Chapter 7 describes maintenance procedures.

Chapter 8 describes troubleshooting procedures.

Appendix A provides Sun StorEdge 3310 array specifications.

Appendix B shows how to cable JBODs to one or more host servers.

Appendix C provides Ethernet connection instructions.

Appendix D provides tables for recording configuration data.

Appendix E provides pinout identification for each connector.

Appendix F provides information on configuring Sun servers running the Solaris™ operating environment.

Appendix G provides information on configuring Windows 2000 servers.

Appendix H provides information on configuring Linux servers.

Appendix I provides information on configuring IBM AIX servers.

Appendix J provides information on configuring HP-UX servers.

Appendix K provides information on configuring Windows NT servers.

Appendix L provides information on installing and accessing the command line interface (CLI)

Using UNIX Commands

This document might not contain information on basic UNIX® commands and procedures such as shutting down the system, booting the system, and configuring devices.

See one or more of the following for this information:

- *Solaris Handbook for Sun Peripherals*
- AnswerBook2™ online documentation for the Solaris operating environment.
- Other software documentation that you received with your system

Typographic Conventions

Typeface*	Meaning	Examples
`AaBbCc123`	The names of commands, files, and directories; on-screen computer output	Edit your `.login`. `login` file. Use `ls -a` to list all files. `% You have mail.`
`AaBbCc123`	What you type, when contrasted with on-screen computer output	`% su` `Password:`
AaBbCc123	Book titles, new words or terms, words to be emphasized. Replace command-line variables with real names or values.	Read Chapter 6 in the *User's Guide*. These are called *class* options. You *must* be superuser to do this. To delete a file, type `rm` *filename*.

* The settings on your browser might differ from these settings.

Shell Prompts

Shell	Prompt
C shell	*machine-name*%
C shell superuser	*machine-name*#
Bourne shell and Korn shell	$
Bourne shell and Korn shell superuser	#

Related Documentation

Title	Part Number
Sun StorEdge 3310 SCSI Array Release Notes	816-7292
Sun StorEdge 3000 Family Best Practices Manual	816-7293
Sun StorEdge 3000 Family RAID Firmware 3.25 User's Guide	816-7296
Sun StorEdge 3000 Family Configuration Service 1.3 User's Guide	817-3337
Sun StorEdge 3000 Family Diagnostic Reporter 1.3 User's Guide	817-3338
Sun StorEdge 3000 Family Rack Installation Guide for 2U Arrays	816-7320
Sun StorEdge 3000 Family FRU Installation Guide	816-7326
Sun StorEdge 3000 Family Safety, Regulatory, and Compliance Manual	816-7930

Contacting Sun Technical Support

For late-breaking news and troubleshooting tips, review the *Sun StorEdge 3310 SCSI Array Release Notes* located at:

`www.sun.com/products-n-solutions/hardware/docs/Network_Storage_Solutions/Workgroup/3310`

If you have technical questions about this product that are not answered in the documentation, go to:

`http://www.sun.com/service/contacting`

To initiate or check on a USA-only service request, contact Sun support at:

800-USA4SUN

To obtain international technical support, contact the sales office of each country at:

`www.sun.com/service/contacting/sales.html`

Accessing Sun Documentation

All Sun StorEdge 3310 SCSI array documentation is available online in both PDF and HTML format at the following location:

`http://www.sun.com/products-n-solutions/hardware/docs/Network_Storage_Solutions/Workgroup/3310`

You can view, print, or purchase a broad selection of Sun documentation at:

`http://www.sun.com/documentation`

You can order printed copies of manuals for the Sun StorEdge 3310 SCSI array at:

`http://corppub.iuniverse.com/marketplace/sun`

508 Accessibility Features

The Sun StorEdge documentation is available in 508-compliant HTML files that can be used with assistive technology programs for visually impaired personnel. These files are provided on the Documentation CD for your product as well as on the websites identified in the previous “Accessing Sun Documentation” section. Additionally, the software and firmware applications provide keyboard navigation and shortcuts, which are documented in the user's guides.

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`http://www.sun.com/hwdocs/feedback`

Please include the title and part number of your document with your feedback: *Sun StorEdge 3000 Family Installation, Operation, and Service Manual*, part number 816-7290-14.

CHAPTER 1

Array Overview

This chapter provides a brief overview of your Sun StorEdge 3310 SCSI array which is an LVD/SE device. Topics covered in this chapter are:

- "Introducing the Array Models" on page 1-1
- "Task Map" on page 1-3
- "Additional Software Tools" on page 1-4

1.1 Introducing the Array Models

The Sun StorEdge 3310 SCSI array models include:

- A redundant array of independent disks (RAID) with a single controller
- A RAID with two controllers
- An expansion unit or JBOD (an array with disks and no controller)

Providing up to 432 GB RAID based on 36 GB drives in an amazingly small footprint (3.5-inch tall by 19 inches wide) storage unit, the Sun StorEdge 3310 SCSI RAID array is a high-performance, storage device that contains one or two internal RAID controllers and up to twelve disk drives with SCSI connectivity to the data host.

FIGURE 1-1 Front View of a Sun StorEdge 3310 SCSI Array (RAID, Expansion Unit, or JBOD)

Highly scalable, the RAID-equipped array supports up to two expansion chassis (expansion unit arrays that have a set of drives and no controller) for a total of 36 drives. The RAID array and expansion units connect to the storage devices and consoles via standard serial port, Ethernet, and SCSI connections.

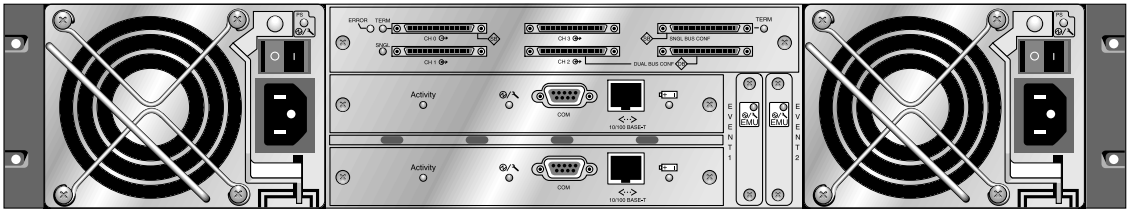


FIGURE 1-2 Rear View of a RAID Array

Also available is the JBOD (Just a Bunch of Disks) which is an expansion unit connected directly to a host server

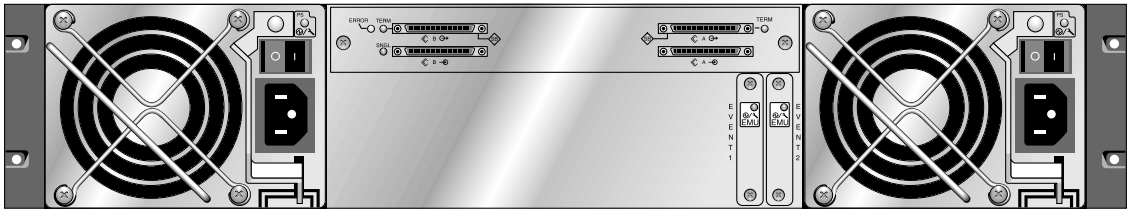


FIGURE 1-3 Rear View of an Expansion Unit or JBOD

Extensive reliability, availability, and serviceability (RAS) features include redundant components, notification of failed components, and the ability to replace components while the unit is online.

The RAID array can be used either as a standalone storage unit or as a building block, interconnected with expansion arrays of the same type. The array can be placed on a tabletop or rackmounted in a server cabinet or expansion cabinet.

For information about specifications and agency approvals, refer to Appendix A, “SCSI Array Specifications” on page A-1.

1.2 Task Map

The following task map outlines the key steps for installing, configuring, and managing the array.

Read Release Notes

Before beginning the installation, review the release notes for late-breaking news and updates, located at:
`www.sun.com/products-n-solutions/hardware/docs/Network_Storage_Solutions/Workgroup/3310`

Prepare Site and Plan Configuration

Prior to installation, you must review important safety guidelines in the *Sun StorEdge 3000 Family Safety, Regulatory, and Compliance Manual.*

To prepare the site and plan the array configuration, refer to:

- *Sun StorEdge 3000 Family Array Installation, Operation, and Service Manual*
- *Sun StorEdge 3000 Family Best Practices Manual*

Prepare Host System

Install up to two HBA adapters in the host system(s). Refer to the documentation that came with your host adapter and system for instructions.

Install Hardware

Install the Sun StorEdge 3310 SCSI Array on a desktop or in a rack. Refer to this manual for instructions, and to the *Sun StorEdge 3000 Family Rack Installation Manual for 2U Arrays* (816-7320).

For additional firmware instructions, refer to *Sun StorEdge 3000 Family RAID Firmware 3.25 User's Guide* (816-7296).

Install Software

Optionally install any or all of the software applications from the Professional Storage Manager CD, and use the following guides.

- *Sun StorEdge 3000 Family Configuration Service 1.2 User Guide*
- *Sun StorEdge 3000 Family Diagnostic Reporter 1.2 User Guide*

1.3 Additional Software Tools

The following additional software tools are available on the Sun StorEdge Professional Storage Manager CD-ROM, provided with your array:

- Sun StorEdge Configuration Service, a management and monitoring program
- Sun StorEdge Diagnostic Reporter software, a monitoring utility
- Sun StorEdge CLI, a command line utility to manage the array.

The Sun StorEdge 3310 SCSI Array Documentation CD-ROM provides the related user guides with detailed installation and configuration procedures for these tools.

For other supported software tools, refer to the release notes for your array, located at:

`www.sun.com/products-n-solutions/hardware/docs/Network_Storage_Solutions/Workgroup/3310`

CHAPTER 2

Site Planning

This chapter outlines the site-planning requirements and basic safety requirements for the installation and use of Sun StorEdge 3310 SCSI arrays. Customers are asked to complete a “Preinstallation Worksheet” on page 2-7 and to prepare the site for installation according to the worksheet details and the specified site planning requirements.

Review the details of this chapter before installing a Sun StorEdge 3310 SCSI array. Topics covered in this chapter are:

- “Customer Obligations” on page 2-2
- “Safety Precautions” on page 2-2
- “Environmental Requirements” on page 2-3
- “Electrical and Power Specifications” on page 2-4
- “Physical Specifications” on page 2-5
- “Layout Map” on page 2-5
- “Console and Other Requirements” on page 2-7
- “Preinstallation Worksheet” on page 2-7

Note – Refer to the *Sun StorEdge 3310 SCSI Array Release Notes* for the current lists of supported operating environments, host platforms, software, and qualified cabinets.

2.1 Customer Obligations

The customer is obliged to inform Sun Microsystems, Inc. of any and all ordinances and regulations that would affect installation.

Caution – When selecting an installation site for the Sun StorEdge 3310 SCSI array, choose a location that avoids excessive heat, direct sunlight, dust, or chemical exposure. Such exposure greatly reduces the product's longevity and might void your warranty.

The customer is responsible for meeting all government codes and regulations concerning facilities. The customer is also responsible for compliance with the following requirements:

- Meet all local, national, and international codes covered in this specification. The subjects covered include fire and safety, building, and electrical codes.
- Document and inform Sun Microsystems, Inc. of any deviations from this specification.

2.2 Safety Precautions

For your protection, observe the following safety precautions when setting up your equipment:

- Follow all safety precautions and requirements specified in the *Sun StorEdge 3310 SCSI Array Safety, Regulatory, and Compliance Manual.*
- A fully loaded array weighs over 50 pounds. Use two people to lift the array to avoid injury.
- Follow all cautions and instructions marked on the equipment.
- Ensure that the voltage and frequency of your power source match the voltage and frequency inscribed on the equipment's electrical rating label.
- Never push objects of any kind through openings in the equipment. Dangerous voltages may be present. Conductive foreign objects could produce a short circuit that could cause fire, electric shock, or damage to your equipment.

- To reduce the risk of electric shock, do not plug Sun products into any other type of power system. Sun products are designed to work with single-phase power systems having a grounded neutral conductor. Contact your facilities manager or a qualified electrician if you are not sure what type of power is supplied to your building.
- Your Sun product is shipped with a grounding-type (three-wire) power cord. To reduce the risk of electric shock, always plug the cord into a grounded power outlet.
- Do not use household extension cords with your Sun product. Not all power cords have the same current ratings. Household extension cords do not have overload protection and are not meant for use with computer systems.
- Do not block or cover the openings of your Sun product. Never place a Sun product near a radiator or heat register. Failure to follow these guidelines can cause overheating and affect the reliability of your Sun product.

2.3 Environmental Requirements

TABLE 2-1 Environmental Specifications

	Operating	Non-Operating
Altitude	To 3000 meters (9000 feet)	To 12,000 meters (36,000 feet)
Temperature	5 degrees C to 35 degrees C	-40 degrees C to +65 degrees C
Humidity Range	10% to 90% @ 40 degrees C (noncondensing)	0 to 93% @ 38degrees C (noncondensing)

2.3.1 Electromagnetic Compatibility (EMC)

The following is required for all installations:

- All AC mains and supply conductors to power distribution boxes for both the rackmounted array and the desktop array must be enclosed in a metal conduit or raceway when specified by local, national, or other applicable government codes and regulations.
- The supply conductors and power distribution boxes (or equivalent metal enclosure) must be grounded at both ends.
- The supplied arrays require voltages within minimum fluctuation.

- The facilities voltage supplied by the customer must maintain a voltage of not more than (+/–) 5 percent. The customer facilities must provide suitable surge protection.

2.4 Electrical and Power Specifications

All Sun StorEdge 3310 SCSI arrays require two independent power sources. Each array has two power-supply-and-fan modules for redundancy.

Each Sun StorEdge 3310 AC array requires two 115 VAC/15A or two 240 VAC service outlets. All AC power supplies are autoranging and are automatically configured to a range of 90-264 VAC and 47-63 Hz. There is no need to make special adjustments.

Each DC array requires two –48 VDC service outlets, and has a input voltage range of –36 VDC to –72 VDC.

Note – To ensure power redundancy, connect the two Sun StorEdge 3310 SCSI power modules to two separate circuits (for example, one commercial circuit and one UPS).

TABLE 2-2 Power Specifications

AC power:	Voltage and frequency 90 to 264 VAC, 47 to 63 Hz
Input current:	5A max
Power-supply output voltages:	+5 VDC and +12 VDC
DC power:	–48 VDC (–36 VDC to –72 VDC)

2.5 Physical Specifications

Use the following physical specifications to plan the location of your array.

TABLE 2-3 Physical Specifications

Category	Description
Dimensions	2U (3.5-in.) height 20-in.chassis depth 17.5-in.(19 in.with ears) width
Installation clearances	For FRU removal and replacement, 15-in.(37 cm) is required front and back.
Cooling clearances	6-in. (15 cm) is required front and back. No cooling clearance is required on the sides or the top and bottom of the array.

2.6 Layout Map

It is helpful to create a sketch or layout map to indicate the exact location for the Sun StorEdge 3310 SCSI array installation as well as the location of the hosts, console, and Ethernet connections that will be connected to it.

As you lay out the components, consider the cable lengths that will be used.

2.6.1 Rack Placement

Follow these guidelines when preparing a rackmount placement for your system.

- Ensure that the floor surface is level.
- Leave enough space in front of the rack to access components for servicing.
- Leave enough space in back of the rack to access components for servicing.
- Keep power and interface cables clear of foot traffic. Route cables inside walls, under the floor, through the ceiling, or in protective channels or raceways.

- Route interface cables (excluding fiber-optic cables) away from motors and other sources of magnetic or radio frequency interference.
- Stay within the cable length limitations.
- Provide two separate power sources for the array. These power sources must be independent of each other, and each must be controlled by a separate circuit breaker at the power distribution point.

2.6.2 Tabletop Placement

Sun StorEdge 3310 SCSI arrays can be positioned on a desk or a table. Follow these guidelines when preparing a tabletop placement for your system.

- Choose a desk or a table that can support 50 pounds for one fully-configured array or 100 pounds for two arrays.
- Do not place the array(s) on the edge of the table. Set the array so that at least 50 percent of the array is inside the table or desk leg support area. Failure to do this may cause the table to tip over.
- Leave enough space in front and in back of the array to access components for servicing. To remove the components requires a clearance of 15 inches (37 cm) in front and in back of the array.
- Provide a minimum space of 6 inches (15 cm) in front and in back of the array for adequate airflow.
- Keep power and interface cables clear of foot traffic. Route cables inside walls, under the floor, through the ceiling, or in protective channels or raceways.
- Route interface cables away from motors and other sources of magnetic or radio frequency interference.
- Stay within the cable length limitations.
- Ensure that the operating system for the array does not exceed the specifications.
- Use two people to lift the array to avoid injury. The array can weigh up to 50 pounds.
- Do not place the array in a vertical position. Place the array horizontally.
- If you are installing multiple arrays you can stack up to five arrays on top of each other. Do not stack more than five arrays in one stack.
- Provide two separate power sources for the array. These power sources must be independent of each other, and each must be controlled by a separate circuit breaker at the power distribution point.

2.7 Console and Other Requirements

A console (with one serial port or one Ethernet connection) is necessary for installation and configuration of your Sun StorEdge 3310 SCSI array.

Refer to the following Preinstallation Worksheet for additional preparation details.

2.8 Preinstallation Worksheet

When ordering a Sun StorEdge 3310 SCSI array, complete the following Preinstallation Worksheet and then prepare the site for installation according to the site-planning requirements.

You are responsible for ensuring that the site consistently conforms to all stipulated standards, and that necessary peripherals are made available to the engineer during installation.

Review the details of your specific survey before installing your Sun StorEdge 3310 SCSI array.

If necessary, attach or sketch a network diagram to the survey.

TABLE 2-4 Preinstallation Worksheet

Rackmounting	Customers must ensure that the appropriate service outlets are available for installation. Requirements vary. Will the Sun StorEdge 3310 SCSI array be rackmounted? Yes / No • Is the rack supplied by Sun? Yes / No • If yes, include Sun model number: ____ • If not, make/model: _____ / _____ Does the rack mount: • Front and back? If so, depth? _____ • Center/Telco? _____ What cable lengths are required? _____ ** Diagram preferred ** Are there any power strips or power sequencers in the rack? Yes / No Are they supplied by Sun? Yes / No If yes, part number: _____ If not, quantity of plugs/outlets required: _____ / _____
IP address	Array IP address: _____._____._____._____ Array network mask: _____._____._____._____
Cabling	SCSI cable lengths to connect to hosts: _____

TABLE 2-5 Host Connectivity Summarized

Host Connectivity - Host #1

Host Name: _____

Host Make/Model: _____

HBA connector types: _____

Cable distance from the array to the host(s): _____

Operating system: _____

Patches installed: _____

IP addresses:
- Network _____
- Host _____

Host Connectivity - Host #2

Host Name: _____

Host Make/Model: _____

HBA connector types: _____

Cable distance from the array to the host(s): _____

Operating system: _____

Patches installed: _____

IP addresses:
- Network _____
- Host _____

CHAPTER 3

Inspecting the Array Package

This chapter gives the general procedure for inspection and reviews the Sun StorEdge 3310 SCSI array package. Topics covered in this chapter are as follows:

- "Unpacking the Array" on page 3-1
- "Checking the Package Contents" on page 3-2
- "Field-Replaceable Units" on page 3-3
- "Customer-Provided Cables" on page 3-4

3.1 Unpacking the Array

Follow these guidelines for unpacking the equipment.

Caution – Always use two people to remove the unit from its container, to avoid personal injury or damage to the equipment during installation. A fully loaded unit weighs approximately 60 pounds.

1. **Select a suitable area for unpacking.**
2. **Store all packing material and boxes for possible equipment returns.**
3. **Check the Contents Sheet in your product package. See "Checking the Package Contents" on page 3-2.**

   The Contents Sheet summarizes the standard contents for your product.
4. **Compare the packing slip and the list of parts with the items you received.**

   If the list of parts on your packing slip does not match the items you received, or any items appear damaged, immediately notify your carrier agent and the supplier who prepared your shipment.

5. **Carefully examine the cables provided in the package.**

   If any cable appears to be damaged, contact the Technical Service department for an immediate replacement.

6. **Check the list of "Customer-Provided Cables" on page 3-4.**

   These are required to complete your installation.

Caution – You must purchase or provide 160M-compliant SCSI cables for connecting the Sun StorEdge 3310 SCSI array to host servers.

3.2 Checking the Package Contents

It is important to inspect your Sun StorEdge 3310 SCSI array packages for standard items as well as purchased options before you begin installation. If any parts are missing or damaged, contact your sales representative immediately.

Quantity	Item
1	One or more of the following Sun StorEdge 3310 SCSI arrays: • Sun StorEdge 3310 SCSI array with single controller • Sun StorEdge 3310 SCSI array with dual controllers • Sun StorEdge 3310 Expansion Unit or JBOD (a group of disks, no controller)
1	• *Sun StorEdge 3310 SCSI Array Contents Sheet* • To download and print the latest Sun StorEdge 3310 SCSI array release notes, go to: `www.sun.com/products-n-solutions/hardware/docs/Network_Storage_Solutions/Workgroup/3310`
2	CDs in a CD set; one CD for software and one CD for user documentation
1	SCSI jumper cable, 1-foot (30cm), VHD-VHD (for bus setting)
1	SCSI jumper cable, 1.5-foot (45cm), VHD-VHD (if you ordered a JBOD or expansion unit)
1	Serial null modem cable
1 or 2	25-foot (7.5m), CAT5 Ethernet cable per controller in each array
1	Cable adapter, DB9-to-DB25
2	DC power cables if you ordered a DC-powered array

Quantity	Item
2	AC cord locks in a plastic bag if you ordered an AC-powered array
2	Front-bezel keys in a plastic bag, to secure the front bezel onto the chassis
Various	Purchased options. These options are ordered at the time of purchase and are integrated into or added to the unit prior to delivery.

3.3 Field-Replaceable Units

Check that you received all field-replaceable units (FRUs) ordered with your Sun StorEdge 3310 SCSI array. For additional FRUs, consult your sales representative. For instructions on how to install or replace FRUS, review the following manuals located on the product website:

- *Sun StorEdge 3000 Family Rack Installation Guide for 2U Arrays*
- *Sun StorEdge 3000 Family FRU Installation Guide*

FRU Model Number	Description
F370-5394-01	Event monitoring unit
F370-5396-01	I/O module, LVD, expansion unit or JBOD
F370-5397-01	I/O module, LVD, RAID
F370-5403-01	Controller module, 512 memory, battery, 2U LVD
F370-5399-01	Terminator module
F370-5422-01	Drive module, 36GB LVD, 10K RPM
F370-5398-01AC	AC power and fan module, 2U
F370-5527-01DC	DC power and fan module, 2U
F370-5533-01	Battery, LVD
F370-5405-01	Cable, LVD, 1-foot, jumper
F370-5528-01	Cable, LVD, 1.5-foot, expansion
F370-5393-01	Box, 2U, JBOD, LVD
F370-5524-01	Box, 2U, RAID, LVD
XTA-3310-DC-KIT	Power and fan module, 2U, DC
XTA-3310-RK-19M	Kit, rackmount, 2U, 19-in. wide, 18- to 28-in. deep

XTA-3310-RK-19L	Kit, Rackmount, 2U, 19-in. wide, 28- to 36-in. deep
XTA-3310-RK-19C	Kit, Telco rackmount center mount, 2U, 19-in wide
XTA-3310-RK-19F	Kit, Telco rackmount flush mount, 2U, 19-in wide

3.4 Customer-Provided Cables

Customers must provide the following cables.

- Two 3-prong AC power cables if you have an AC-powered array.
- One Ultra 160 SCSI cable per host to connect a host to a RAID array, expansion unit or JBOD; up to two host cables may be needed per array.

To obtain qualified cables, consult your Sun sales representative.

CHAPTER 4

Connecting Ports

This chapter provides procedures for cabling the Sun StorEdge 3310 SCSI array for single or dual-bus configurations and for connecting the array to power and to network devices.

The topics covered in this chapter are as follows:

- "Converting Your Front Bezel Locks So the Keys Cannot Be Removed" on page 4-2
- "Rack-Mounting the Array" on page 4-4
- "Hardware Connections" on page 4-4
- "Connecting the Chassis to an AC Power Outlet" on page 4-6
- "Connecting the Chassis to DC Power Outlets" on page 4-8
- "Single and Dual Drive-Bus Configurations" on page 4-9
- "Connecting Cables for a Single-Bus Configuration" on page 4-12
- "Connecting Cables for a Dual-Bus Configuration" on page 4-16
- "Connecting SCSI Ports to Host(s)" on page 4-19
- "Cabling Configurations with Two Expansion Units" on page 4-20
- "Connecting COM Port to a VT100 Terminal or Solaris Workstation" on page 4-23
- "Connecting Ethernet Ports to LAN/WAN (Optional)" on page 4-23

Before you connect the Sun StorEdge 3310 SCSI array to the network, position the Sun StorEdge 3310 SCSI array in the rack or in the location where it will remain.

Caution – When positioning the array, do not block the air vents at the front or back of the unit. Follow all safety precautions specified in the *Sun StorEdge 3310 Safety, Regulatory, and Compliance Manual.*

Caution – When you power off the array, wait five seconds before you power it back on. If you power the array off and on too quickly, a race condition might occur.

4.1 Converting Your Front Bezel Locks So the Keys Cannot Be Removed

The bezel on your array has two locks whose keys can be removed when the locks are in either the locked or open position. It is possible to reconfigure the locks so that the keys cannot be removed.

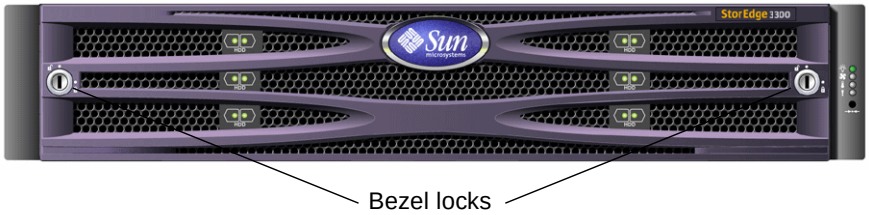


FIGURE 4-1 Front Bezel and Front Bezel Locks of an Array

To change the locks so the keys cannot be removed, follow these steps:

1. **Remove the bezel by gently pivoting the swing arms out of their ear sockets.**
2. **Make sure the key is in the locked position, with the pawl extending horizontally past the edge of the bezel.**

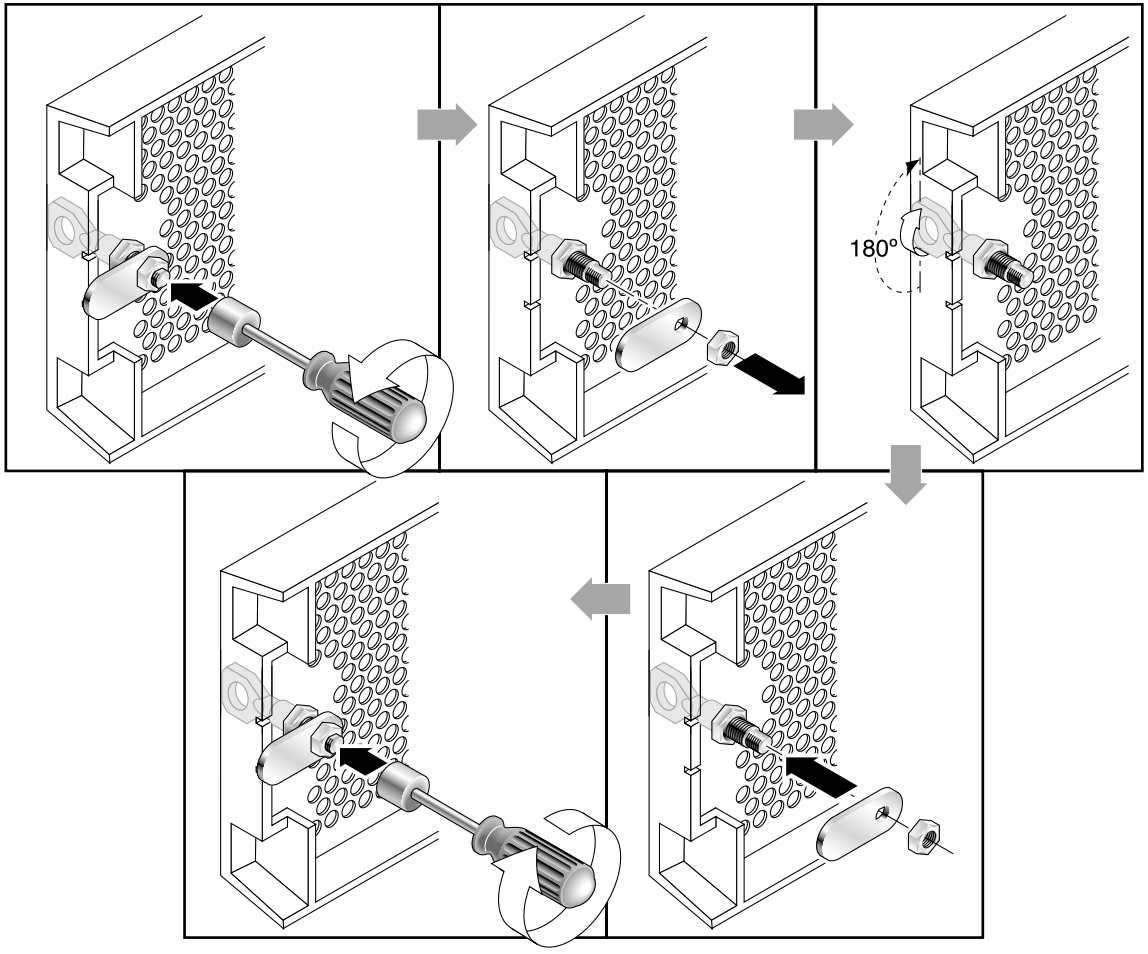


FIGURE 4-2 Sequence of Steps to Change Front Bezel Locks So Keys Cannot Be Removed

3. **Hold the key in place and use a 12-mm or 3/8-inch nut driver to remove the locking nut that holds the pawl in place, as shown in the first panel of** FIGURE 4-2**.**

Caution – Be sure to hold the key in place. Otherwise there is a risk of breaking the small tab on the lock that serves as a stop.

4. **Lift the pawl off the threaded part of the lock body, as shown in the second panel of** FIGURE 4-2**.**

5. **Set the pawl aside, face up, so that you can remember its orientation when you replace it.**

6. **Use the key to turn the lock 180 degrees, as shown in the third panel of** FIGURE 4-2
7. **Replace the pawl in the same orientation as before, as shown in the fourth panel of** FIGURE 4-2**.**
8. **Hold the key in place and use the nut driver to refasten the locking nut that holds the pawl in place, as shown in the fifth panel of** FIGURE 4-2**. Be careful not to cross-thread the nut.**

Caution – Be sure to hold the key in place. Otherwise there is a risk of breaking the small tab on the lock that serves as a stop.

9. **Replace the bezel.**

Note – To convert your bezel locks back so that the keys can be removed, repeat this procedure.

4.2 Rack-Mounting the Array

To rackmount the array in a rack or a cabinet, refer to the installation manual which is provided with the rack or refer to the *Sun StorEdge 3000 Family Rack Installation Guide for 2U Arrays* on the product website.

4.3 Hardware Connections

FIGURE 4-3 identifies a typical series of hardware connections used when you install an array. These procedures are designed for a redundant configuration.

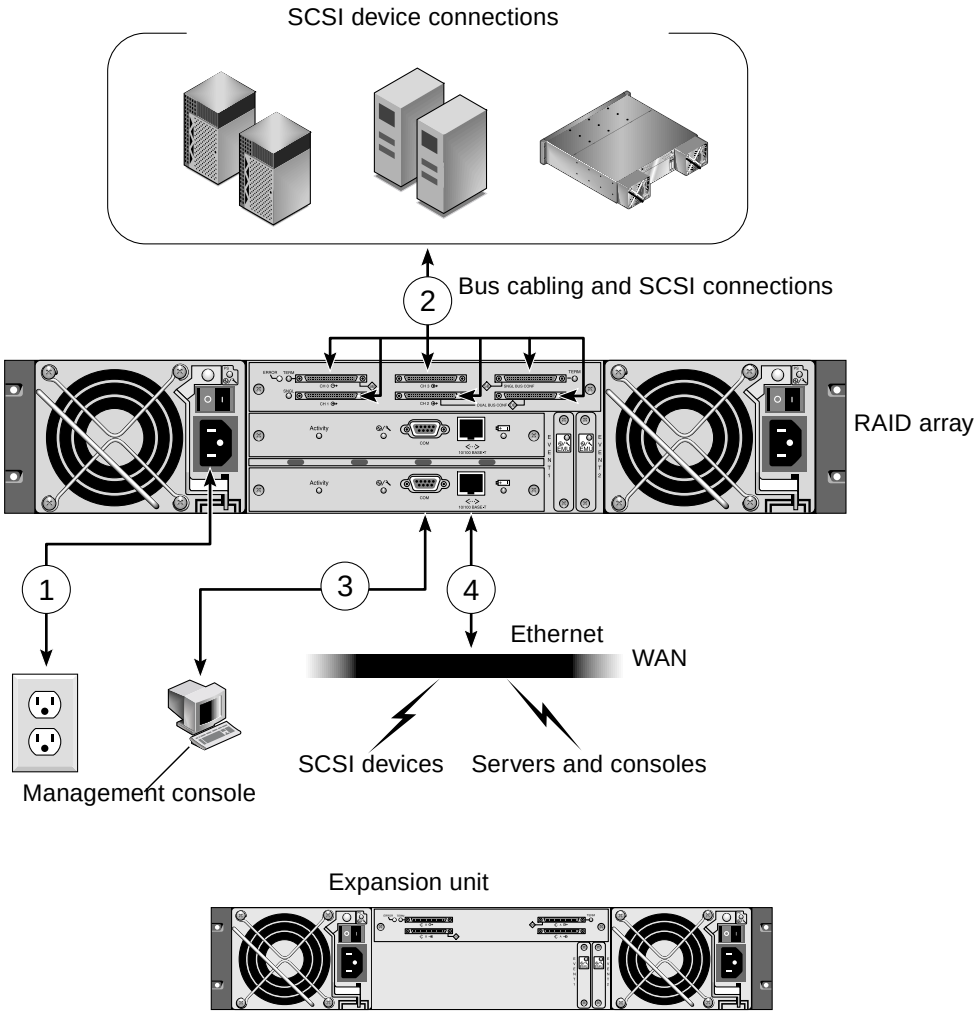


FIGURE 4-3 Typical Sequence of Installation Steps

4.4 Connecting the Chassis to an AC Power Outlet

When you connect the AC power cords, you should install the provided two cord locks at the same time. The provided AC cord locks are used to securely fasten the AC cable connectors.

Caution – For AC power: If the array is connected to AC power sources not within the designated 90–135, 180–265 VAC PFC range, damage might occur to the unit.

Note – To ensure power redundancy, be sure to connect the two power supply modules to two separate circuits (for example, one commercial circuit and one UPS).

To connect the AC power cords, perform the following procedure.

1. **Obtain an appropriate AC power cable.**
2. **Use a screwdriver to remove the screw and cylindrical standoff from one of the two cord locks provided and set them aside for reassembly later.**

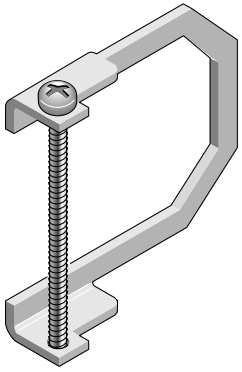


FIGURE 4-4 AC Cord Lock

3. **Slide the cord lock over the AC power connector.**
4. **Hold the cylindrical standoff between the two screw-holes on the flanges of the cord lock.**
5. **Insert the screw into the first screw-hole, through the standoff, and then into the threaded screw-hole on the other flange.**

6. **Tighten the screw with a screwdriver until the flanges bottom out on the cylindrical standoff.**
7. **Push the power cord into the power supply receptacle until it is firmly seated.**
8. **Push the green ejector handle forward until it is seated against the power supply.**
9. **Turn the thumbscrew of the green ejector handle clockwise until it is finger-tight to secure the handle and the cord lock.**

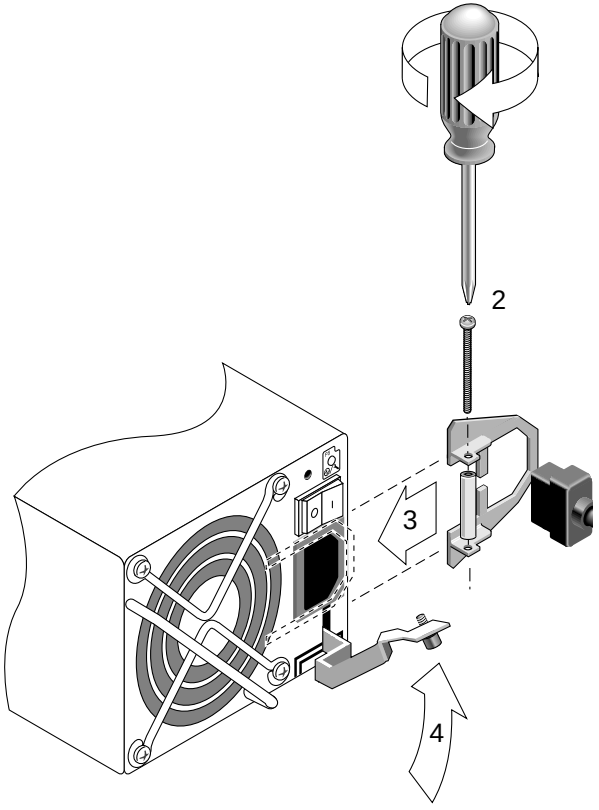


FIGURE 4-5 Inserting the Cord Lock

10. **Repeat this procedure for the second cord lock and second power cable.**

4.5 Connecting the Chassis to DC Power Outlets

Two CD power cords are packaged with each DC array. To connect the DC power cords, perform the following procedure.

1. **Connect a DC power cable to the first power supply and to a power outlet.**

Note – Use only the DC power cables provided with the array.

---

2. **Check the DC cable part number and wire labels carefully before connecting the cable to the source.**

TABLE 4-1 DC Cable Wiring for Cable 35-00000148

Pin Number	Voltage	Color
A3	Return	Red
A2	GND (Chassis Ground)	Green / Yellow
A1	-48 VDC	Black

TABLE 4-2 DC Cable Wiring for Cable 35-00000156

Pin Number	Voltage	Color
A3	L+	Red
A2	GND (Chassis Ground)	Green / Yellow
A1	L-	White

Caution – If the Sun StorEdge 3310 SCSI array is connected to DC power sources not within the designated –48V DC (–36 VDC to –72 VDC) range, damage might occur to the unit.

Note – To ensure power redundancy, be sure to connect the two power supply modules to two separate circuits (for example, one commercial circuit and one UPS).

Note – To extend the length of the DC power cable as needed, strip the last 1/4" of the cable, insert the stripped end into a provided Panduit tube, and crimp the tube.

3. **Tighten the cable locking screws to attach the cable securely to the power supply power outlet.**
4. **Connect the second power cable to the second power supply and to a second power outlet. Tighten the cable locking screws.**

   If one power supply fails, the second power supply automatically takes the full load.

4.6 Single and Dual Drive-Bus Configurations

The drive-bus configuration determines how drives and drive IDs are assigned to drive channels on the controller.

A single-bus configuration assigns all disk drive IDs in a controller to one channel (typically CH 0 for the RAID array and CH 2 for an expansion unit).

A dual-bus configuration assigns half the disk drive IDs to CH 0 and the other half to CH 2 in the RAID array, and then typically adds additional disk drive IDs to both CH 0 and CH2 when it is connected to an expansion unit.

The following figures illustrate the six standard cabling scenarios for a 12-drive array:

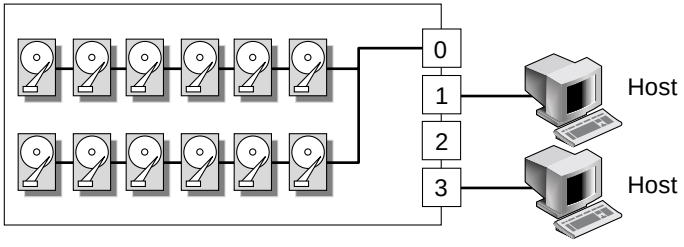


FIGURE 4-6 Configuration #1: Single-Bus Configuration With Two Hosts

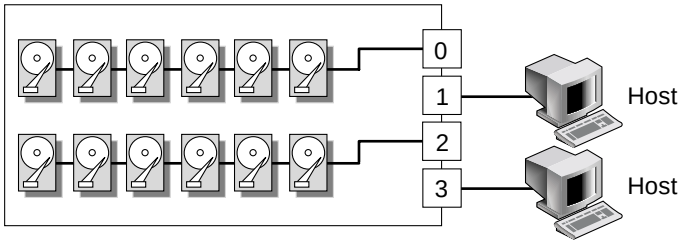


FIGURE 4-7 Configuration #2: Dual-Bus Configuration With Two Hosts

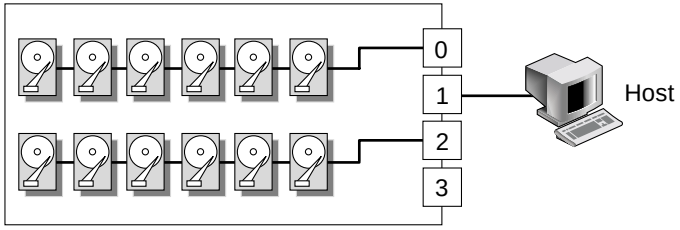


FIGURE 4-8 Configuration #3: Dual-Bus Configuration With One Host

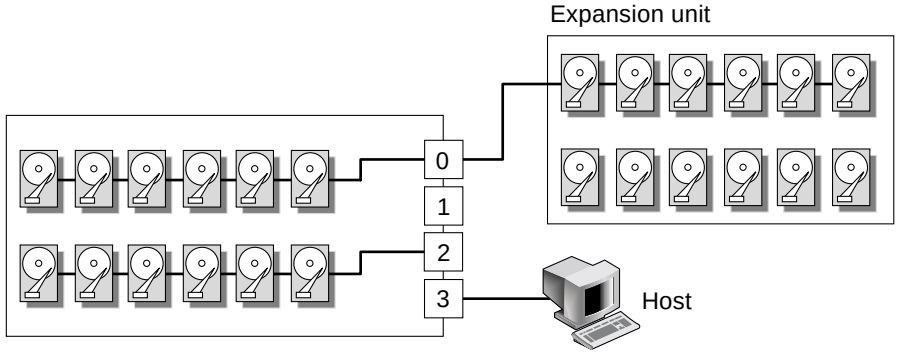


FIGURE 4-9 Configuration #4: Dual-Bus Configuration With One Expansion Unit

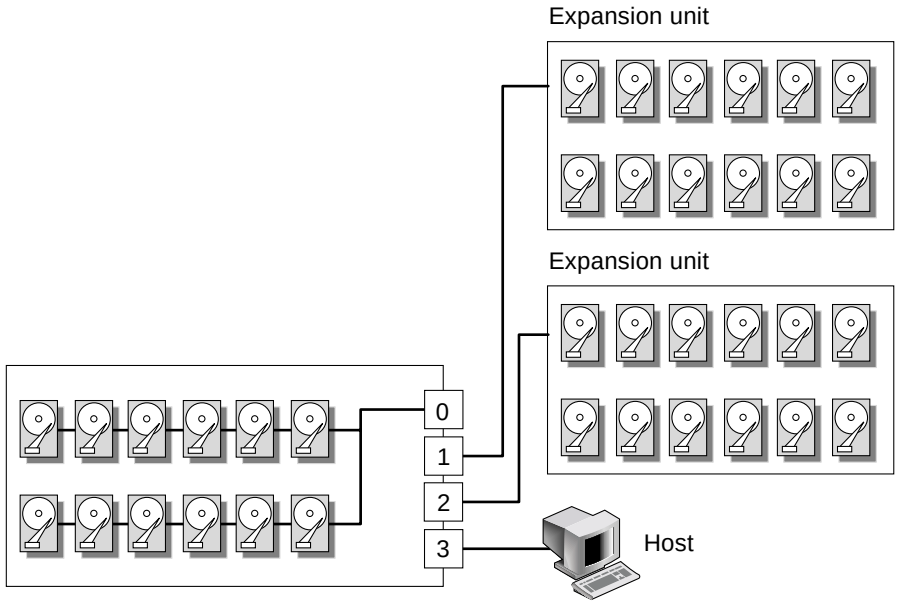


FIGURE 4-10 Configuration #5: Single-Bus Configuration with Two Expansion Units

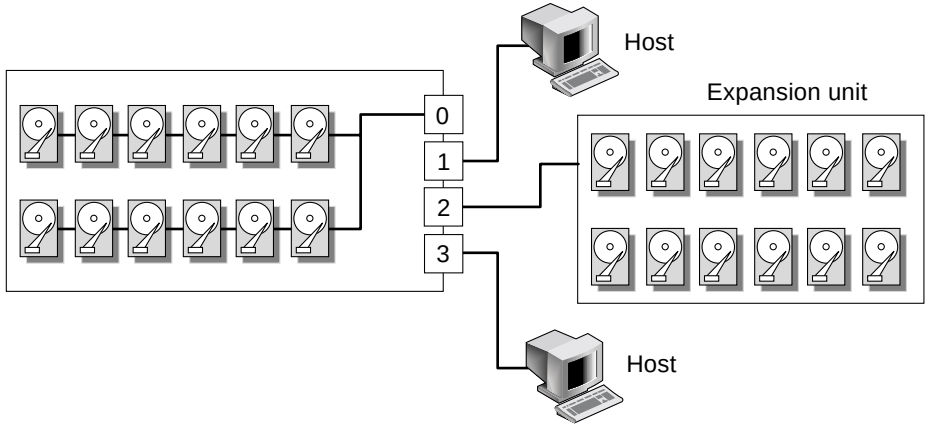


FIGURE 4-11 Configuration #6: Single-Bus RAID Connected to One Expansion Unit

Each drive channel can have up to 16 IDs (0 to 15); ID 6 and ID 7 are reserved for internal connections.

Caution – A maximum of 16 drive IDs is allowed per channel. Therefore, *do not* connect a dual-bus Channel 0 or Channel 2 (6 IDs) to a single-bus expansion unit (12 IDs).

On the rear panel of each RAID array on the I/O module, the SB icon is displayed next to the CH 0 port and the SCSI SNGL BUS CONF port to indicate where to connect the SCSI jumper cable for a single-bus configuration.

Similarly, the DB icon is displayed next to the CH 2 port and the dual-bus CONF port to indicate where to connect the SCSI jumper cable for a dual-bus configuration.

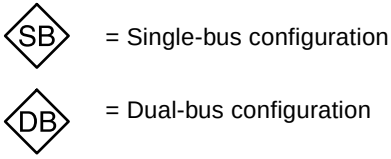


FIGURE 4-12 Single-Bus and Dual-Bus Icons

On the rear panel of each expansion unit, the SB icon indicates where to connect the jumper cable for a single-bus configuration.

The SCSI IDs are also displayed on the lower inside-front edge of the chassis. These IDs are automatically assigned and appear in the RAID controller status tables.

DUAL/SNGL	DUAL/SNGL	DUAL/SNGL	DUAL/SNGL
CH2-ID0 CH0-ID0	CH2-ID3 CH0-ID3	CH0-ID0 CH0-ID8	CH0-ID3 CH0-ID11
CH2-ID1 CH0-ID1	CH2-ID4 CH0-ID4	CH0-ID1 CH0-ID9	CH0-ID4 CH0-ID12
CH2-ID2 CH0-ID2	CH2-ID5 CH0-ID5	CH0-ID2 CH0-ID10	CH0-ID5 CH0-ID13

FIGURE 4-13 Disk Drive IDs Displayed Inside the Lower Edge of the Chassis

4.7 Connecting Cables for a Single-Bus Configuration

A single-bus I/O configuration assigns all disk drive IDs in a chassis (RAID or expansion unit) to one channel. This configuration is convenient administratively if you want to assign all RAID array drive IDs to Channel 0, and assign all expansion unit drive IDs to Channel 2.

1. **To configure a RAID array as a single-bus configuration, connect the SCSI jumper cable between the SCSI ports labeled “CH 0” and “SNGL BUS CONF” as shown in** FIGURE 4-14**. Tighten the cable jack screws with six full clockwise turns to ensure proper connection and operation.**

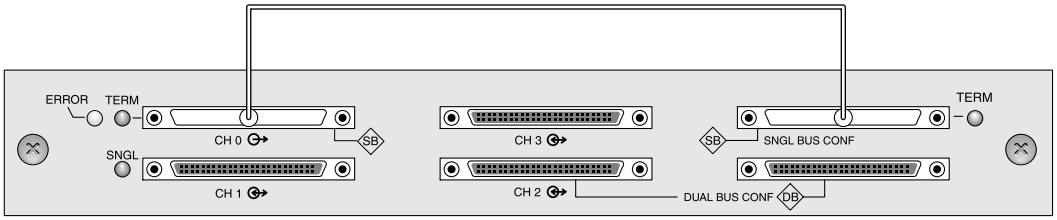


FIGURE 4-14 Single-Bus Connection: All Drives are Assigned to a Single Channel (CH 0)

2. **To configure an expansion unit as a single-bus configuration, connect the SCSI jumper cable between SCSI ports (lower left and upper right ports), as shown in** FIGURE 4-15**. Tighten the cable jack screws with six full clockwise turns to ensure proper connection and operation.**

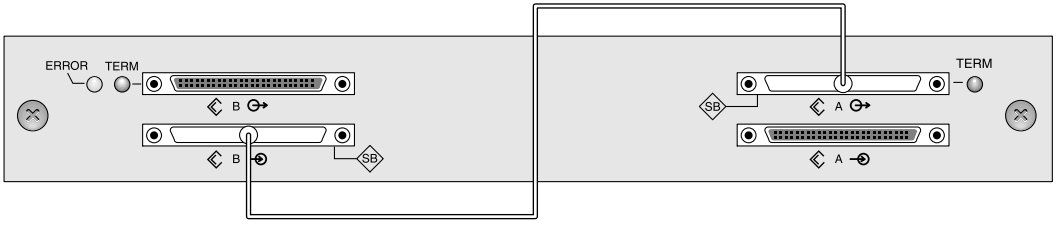


FIGURE 4-15 Cabling for Single-Bus Expansion Unit

Caution – A maximum of 16 drive IDs is allowed per channel. Therefore, with a 12-drive array, do not connect a dual-bus Channel 0 or Channel 2 (6 IDs) to a single-bus expansion unit (12 IDs).

3. **(Optional) Use a SCSI cable to connect a RAID array (Channel 2 port) to an expansion unit (lower right port). Tighten the cable jack screws with six full clockwise turns to ensure proper connection and operation.**

   The configuration in FIGURE 4-16 shows a RAID array with all its drive IDs assigned to Channel 0, and an expansion unit with all its drive IDs assigned to Channel 2.

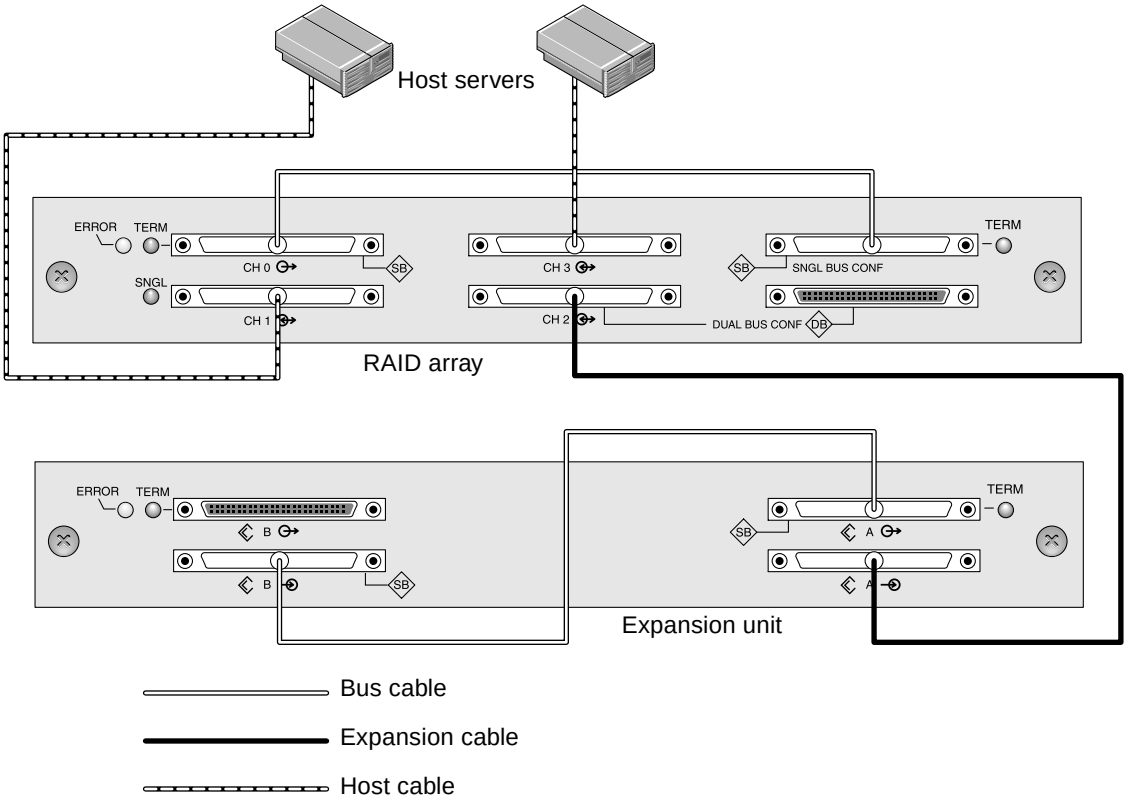


FIGURE 4-16 Typical Single-Bus Configuration

Based on the configuration in FIGURE 4-16, the default drive IDs for a 12-drive single-bus configuration are shown in FIGURE 4-17 and FIGURE 4-18. (ID6 and ID7 are reserved for host HBAs.)

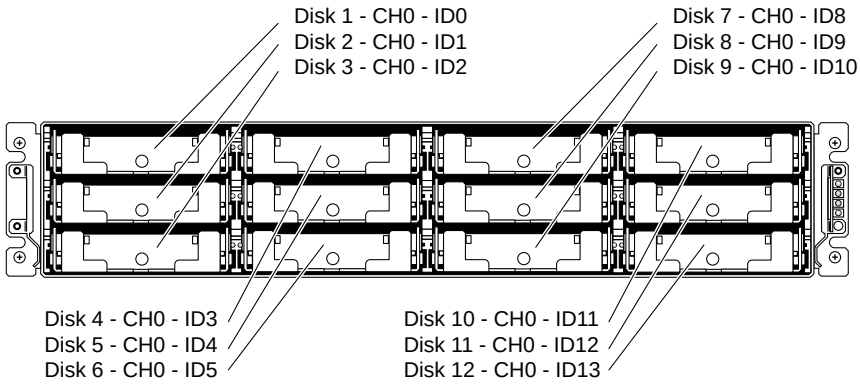

Disk 1 - CH0 - ID0
Disk 2 - CH0 - ID1
Disk 3 - CH0 - ID2
Disk 7 - CH0 - ID8
Disk 8 - CH0 - ID9
Disk 9 - CH0 - ID10
Disk 4 - CH0 - ID3
Disk 5 - CH0 - ID4
Disk 6 - CH0 - ID5
Disk 10 - CH0 - ID11
Disk 11 - CH0 - ID12
Disk 12 - CH0 - ID13

FIGURE 4-17 RAID Array - Single-Bus Configuration, Default IDs

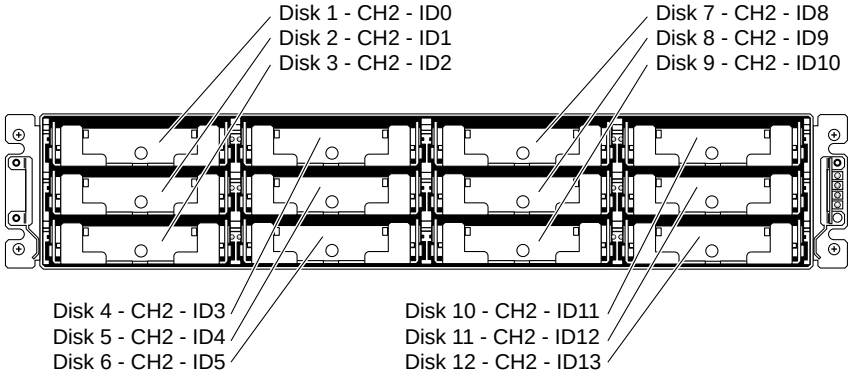

Disk 1 - CH2 - ID0
Disk 2 - CH2 - ID1
Disk 3 - CH2 - ID2
Disk 7 - CH2 - ID8
Disk 8 - CH2 - ID9
Disk 9 - CH2 - ID10
Disk 4 - CH2 - ID3
Disk 5 - CH2 - ID4
Disk 6 - CH2 - ID5
Disk 10 - CH2 - ID11
Disk 11 - CH2 - ID12
Disk 12 - CH2 - ID13

FIGURE 4-18 Expansion Unit - Single-Bus Configuration, Default IDs

The IDs are also displayed on the lower inside-front edge of the chassis. These IDs are automatically assigned and appear in RAID controller status tables.

4. **Connect your RAID array (SCSI Channel 1 and 3 ports) to one or two host servers with SCSI cables.**

   SCSI ports for Channels 1 and 3 are assigned as host channels by default.

4.8 Connecting Cables for a Dual-Bus Configuration

A dual-bus configuration assigns half the disk drives to one channel and the other to the second channel. This configuration can be helpful when you want to use one set of drives to mirror the second set with drives configured as RAID 1 drives.

1. **To create a dual-bus configuration on a RAID array, use the SCSI jumper cable to connect the CH 2 port to the dual-bus CONF port. Tighten the cable jack screws with six full clockwise turns to ensure proper connection and operation.**

   Six IDs are assigned to CH 0, and six IDs are assigned to CH 2 in a 12-drive array.

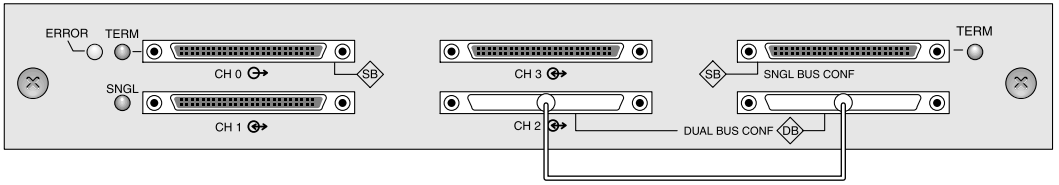


FIGURE 4-19 RAID Dual-Bus Configuration

In the dual-bus JBOD configuration, no jumper cable is required.

FIGURE 4-20 Expansion Unit Dual-Bus Configuration

2. **(Optional) Use a SCSI cable to connect a RAID array (Channel 2 port) to an expansion unit lower input port. Tighten the cable jack screws with six full clockwise turns to ensure proper connection and operation.**

   In FIGURE 4-21, RAID Channels 0 and 2 are expanded into the expansion unit, in a dual-bus configuration set up on the RAID array and kept by default for the expansion unit.

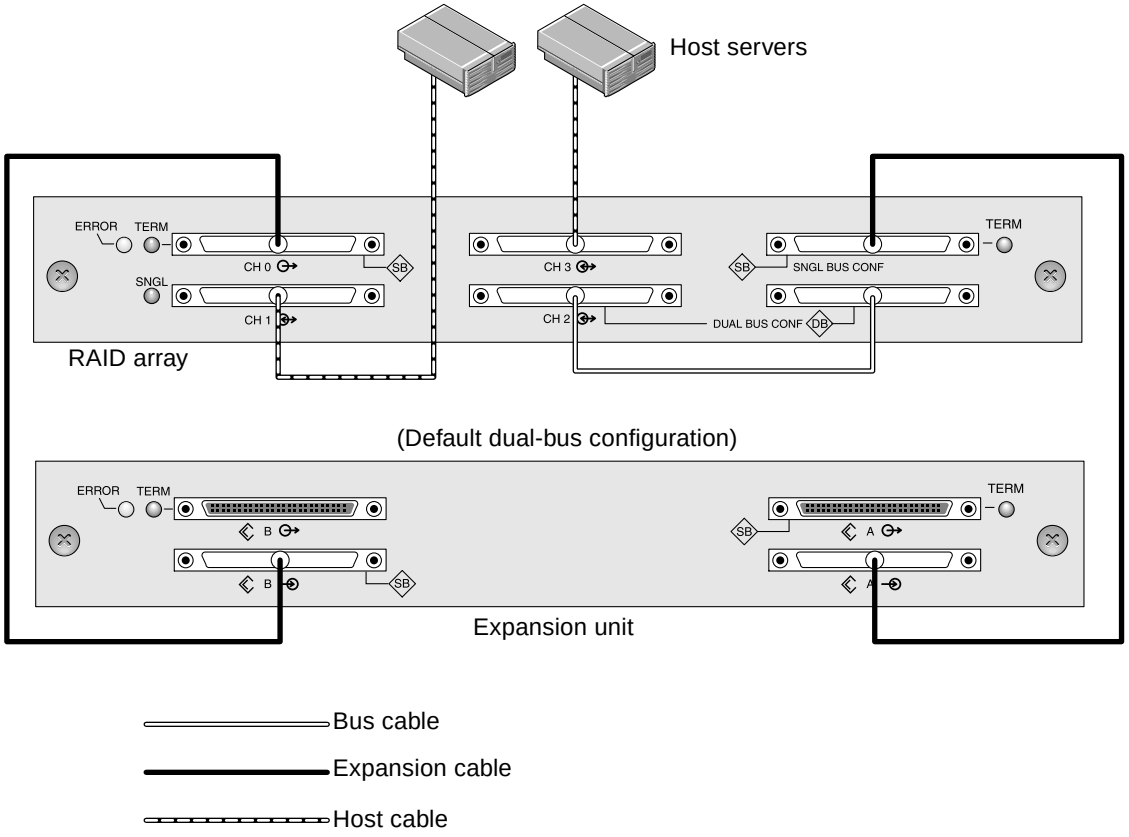


FIGURE 4-21 Dual-Bus Configuration with One RAID Array and One Expansion Unit

Caution – A maximum of 16 drive IDs is allowed per channel. Therefore, with a 12-drive array, do not connect a dual-bus Channel 0 or Channel 2 (6 IDs) to a single-bus expansion unit (12 IDs).

The dual-bus configuration shown in the preceding figure assigns half the IDs from the RAID and the expansion unit to Channel 0, and the other half to Channel 2. The "SINGLE BUS CONF" port is a Channel 2 expansion port in a dual-bus configuration.

3. **Based on the configuration shown in** FIGURE 4-21**, the default drive IDs for a dual-bus configuration are shown in the following figures.**

   ID6 and ID7 are reserved and are not available for drive IDs.

   The IDs are also displayed on the lower inside edge of the chassis. These IDs are automatically assigned and appear in RAID controller status tables.

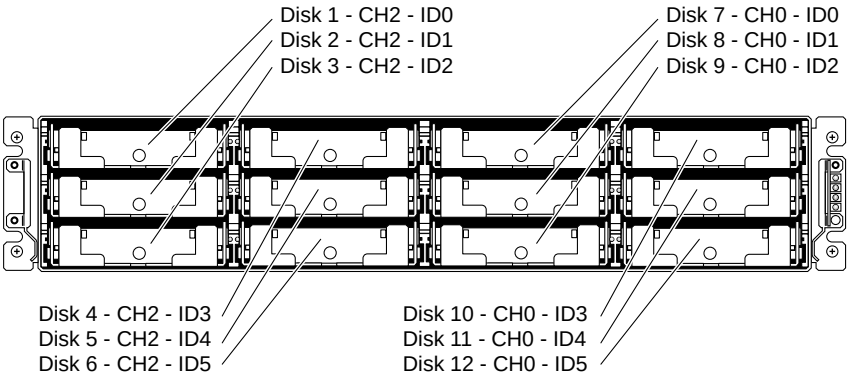

Disk 1 - CH2 - ID0
Disk 2 - CH2 - ID1
Disk 3 - CH2 - ID2
Disk 7 - CH0 - ID0
Disk 8 - CH0 - ID1
Disk 9 - CH0 - ID2
Disk 4 - CH2 - ID3
Disk 5 - CH2 - ID4
Disk 6 - CH2 - ID5
Disk 10 - CH0 - ID3
Disk 11 - CH0 - ID4
Disk 12 - CH0 - ID5

FIGURE 4-22 RAID Array: Dual-Bus Configuration, Default IDs

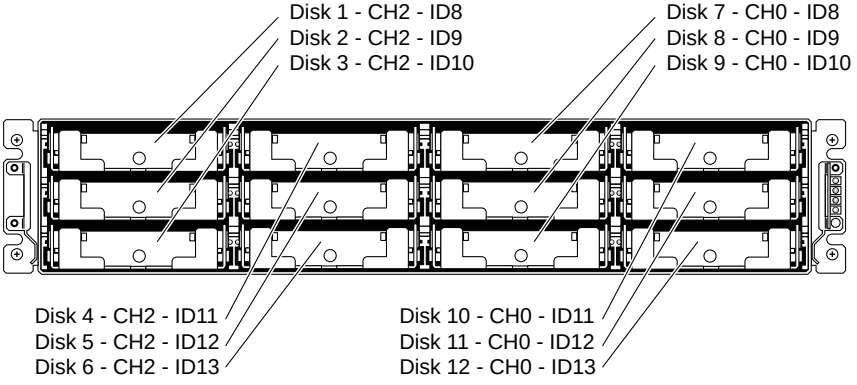

Disk 1 - CH2 - ID8
Disk 2 - CH2 - ID9
Disk 3 - CH2 - ID10
Disk 7 - CH0 - ID8
Disk 8 - CH0 - ID9
Disk 9 - CH0 - ID10
Disk 4 - CH2 - ID11
Disk 5 - CH2 - ID12
Disk 6 - CH2 - ID13
Disk 10 - CH0 - ID11
Disk 11 - CH0 - ID12
Disk 12 - CH0 - ID13

FIGURE 4-23 Expansion Unit: Dual-Bus Configuration, Default IDs

4. Connect your RAID array (SCSI Channel 1 and 3 ports) to two host servers with SCSI cables.

SCSI ports for Channels 1 and 3 are assigned as host channels by default.

4.9 Connecting SCSI Ports to Host(s)

By default, channels 1 and 3 (the upper middle SCSI port and lower left SCSI port on the I/O module) are host channels. The array can be connected to a host in one of the two following ways:

- By means of a Sun StorEdge 160-MB/second PCI Dual Ultra3 SCSI host adapter part number X6758A, installed in a host
- By means of a qualified and supported onboard single-ended, 40-MB/second SCSI server-embedded SCSI controller

Connect the array to one or two hosts with SCSI cables. Refer to the *Sun StorEdge 3310 SCSI Array Release Notes* for a list of the supported cables.

4.9.1 Connecting a Sun StorEdge 3310 RAID Array

The SCSI specification states that the maximum bus length for Ultra3 SCSI is 25 meters for point-to-point connections. The Sun StorEdge 3310 RAID array uses a point-to-point implementation. Each channel connector is on a separate physical SCSI bus.

Taking into account the internal bus length of .5 meters and the internal SCSI bus length of the host, the maximum SCSI cable length to each channel connector could conceivably be around 24 meters when connected to an Ultra3 host adapter. However, the longest Ultra3 cable qualified by Sun is 10 meters in length.

When connected to single-ended host adapters, the longest support bus length per connector is 1.5 meters.

Note – When connecting to Ultra3 host adapters, all SCSI cables must be Ultra3-qualified.

Note – If you connect two hosts to the same channel on a RAID array, you do not need to change the scsi-initiator-id of one host adapter.

4.9.2 Connecting a Sun StorEdge 3310 JBOD Array

The SCSI specification states that the maximum bus length for Ultra3 SCSI is 12 meters for multidrop connections. The Sun StorEdge 3310 JBOD array uses a multidrop implementation. The ports on each channel are connected to the same physical SCSI bus.

Taking into account the internal bus length of .5 meters, and the internal SCSI bus length of the host, the maximum SCSI bus length for each channel is 12 meters when connected to an LVD host adapter.

You must ensure that the length of all cables to any connected nodes, as well as the internal bus length of .5 meters internal to the Sun StorEdge 3310 JBOD array and the internal bus length of the host, is less than 12 meters in total. Also include the jumper cable length of.3 meters if the JBOD is being used in a single-bus configuration.

The longest Ultra3 cable qualified by Sun is 10 meters in length.

When connected to single-ended host adapters, the longest supported bus length per channel is 1.5 meters.

Note – If you connect two hosts to the same channel, you must change the scsi-initiator-id of one host adapter as described in the host adapter documentation. When either of these hosts is subsequently booted, SCSI reset warnings are displayed on the other host.

4.10 Cabling Configurations with Two Expansion Units

Designed for a fully redundant configuration, a standard RAID array has Channels 0 and 2 assigned as drive channels, and Channels 1 and 3 assigned as host channels.

However, you can attach two expansion units to a RAID array if Channel 1 or Channel 3 is configured as a drive channel. For details, refer to “Configuring SCSI Channels as Host or Drive (Optional)” on page 5-8.

The following figures are examples of configurations that have a RAID array connected to two expansion units.

Caution – A maximum of 16 drive IDs is allowed per channel. Therefore, in a 12-drive array, do not connect a dual-bus Channel 0 or Channel 2 (6 IDs) to a single-bus expansion unit (12 IDs).

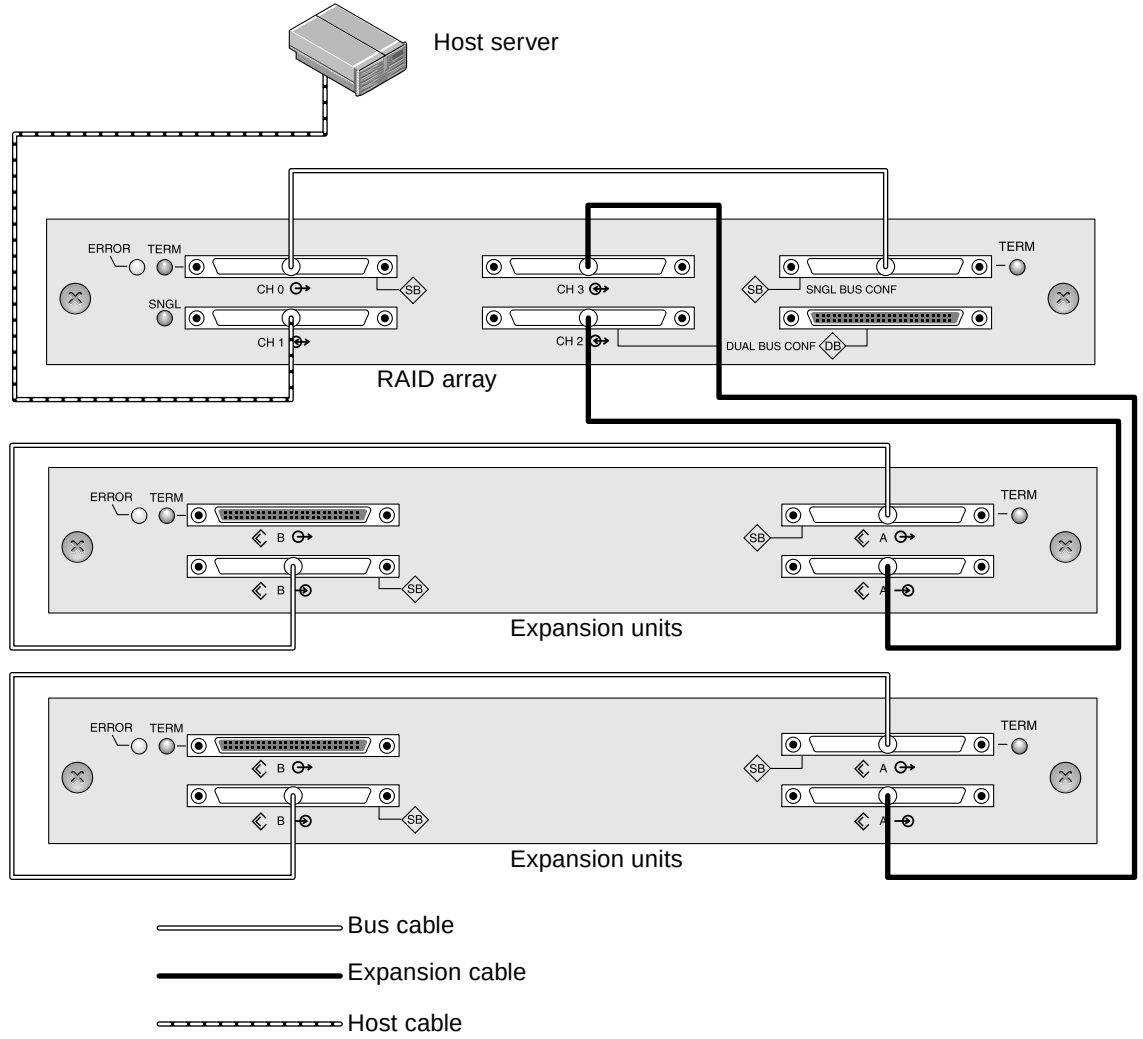


FIGURE 4-24 Single-Bus Configuration with One Host and Two Expansion Units

In FIGURE 4-24, the RAID array and the two expansion units have been set up for single-bus configuration; Channel 3 has been reassigned as a drive channel and connected to the second expansion unit.

In FIGURE 4-25, the RAID array and one expansion unit #1 have been configured for dual-bus configuration and expansion unit #2 is set for single-bus configuration; Channel 3 has been reassigned as a drive channel and connected to the second expansion unit. The RAID Channels 0 and 2 are connected and expanded into the dual-bus expansion unit #1, and RAID Channel 3 is connected and expanded into a single-bus expansion unit #2.

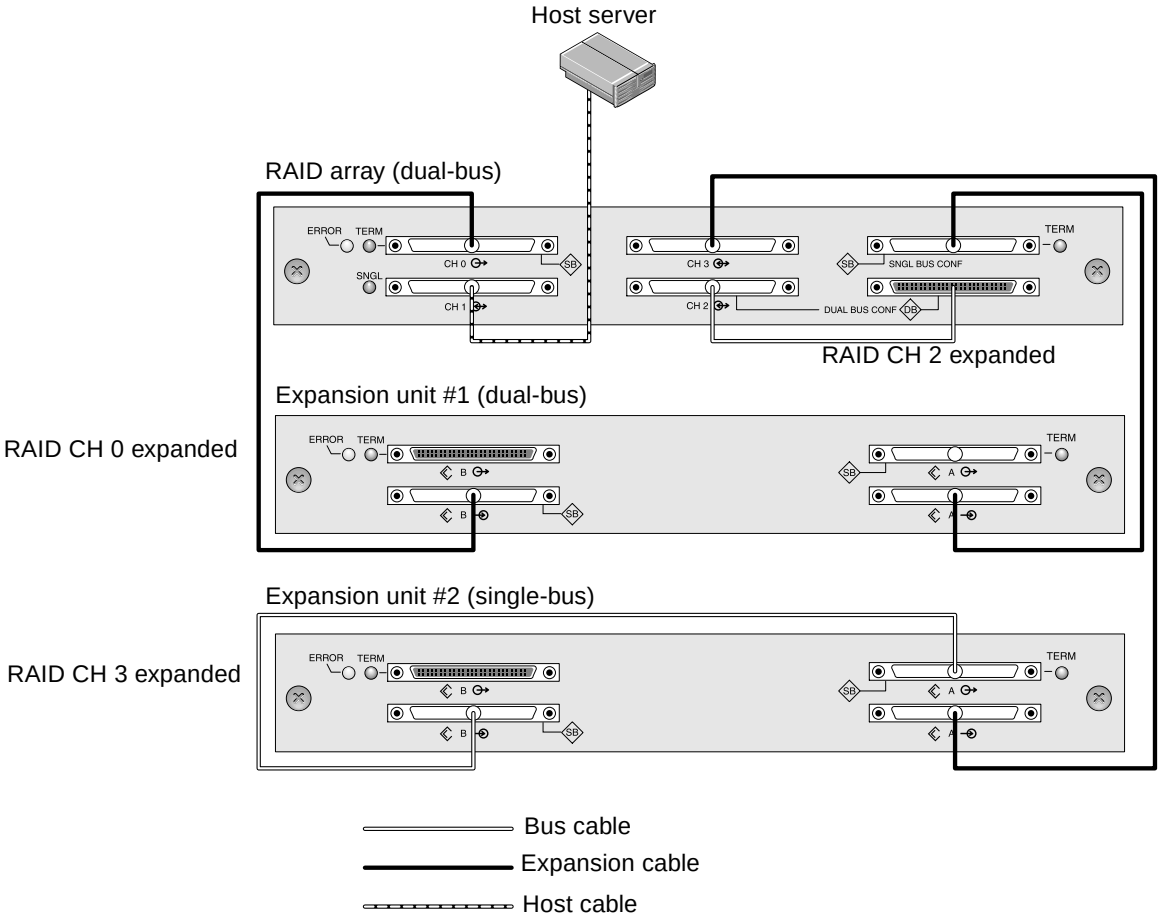


FIGURE 4-25 Dual/Single-Bus Configuration With One Host and Two Expansion Units

4.11 Connecting COM Port to a VT100 Terminal or Solaris Workstation

The RS-232 COM port on either controller module is used to configure and monitor the RAID array. It can be connected to a VT100 terminal or terminal emulation program, to a terminal server, or to the serial port of a Solaris host.

1. **Use a serial cable to connect the COM port of the RAID array to the serial port on a workstation/terminal server/terminal.**
2. **Set the serial port parameters on the workstation/ terminal server/terminal as follows: 38400 baud, 8 bit, 1 stop bit, no parity.**

   For details, see “Setting Up the Serial Port Connection” on page 5-6.

4.12 Connecting Ethernet Ports to LAN / WAN (Optional)

The Ethernet connection enables you to configure and monitor RAID arrays and expansion units remotely by using the Sun StorEdge Configuration Service software. See “Ethernet Connection” on page C-1 for details about the Ethernet port connection.

CHAPTER 5

First-Time Configuration

This chapter summarizes the most common procedures used for first-time configuration and includes the following topics:

- "Controller Defaults and Limitations" on page 5-2
- "Battery Operation" on page 5-3
  - "Battery Status" on page 5-3
- "Write Back Versus Write Through Cache Options" on page 5-4
- "Accessing the Management Tools" on page 5-4
- "First-Time Controller Configuration" on page 5-5
  - "Setting Up the Serial Port Connection" on page 5-6
  - "Viewing the Initial Firmware Windows" on page 5-7
  - "Configuring SCSI Channels as Host or Drive (Optional)" on page 5-8
  - "Creating Additional Host IDs (Optional)" on page 5-10
  - "Selecting Sequential or Random Optimization" on page 5-12
  - "Reviewing Default Logical Drives and RAID Levels" on page 5-14
  - "Completing Basic Configuration" on page 5-15
  - "Creating Logical Drive(s) (optional)" on page 5-15
  - "Changing a Logical Drive Controller Assignment (Optional)" on page 5-21
  - "Partitioning a Logical Drive (optional)" on page 5-22
  - "Planning for 128 LUNs (Optional)" on page 5-25
  - "Mapping Logical Drive Partitions to Host LUNs" on page 5-27
  - "Creating Logical Drive(s) (optional)" on page 5-15
  - "Saving Configuration (NVRAM) to a Disk" on page 5-30
- "Installing Software" on page 5-31
  - "Other Supported Software" on page 5-31
  - "Enabling VERITAS DMP" on page 5-31

5.1 Controller Defaults and Limitations

The following controller functions describe the redundant controller operation.

- Both controllers must be exactly the same. They must operate with the same firmware version, the same size of memory, and the same number of host and drive channels. If one controller in a dual controller configuration is replaced with a field-replaceable unit (FRU) controller, the array automatically compares the firmware versions of the two controllers. If they differ, the FRU controller firmware is automatically changed to that of the existing controller in the array.
- In redundant mode, the maximum number of disk drive IDs on a SCSI drive channel is 16. IDs 6 and 7 are used for host HBA connections.
- Upon bootup in a redundant configuration, the controllers autonegotiate and designate one controller as primary and the other controller as secondary.
- The two controllers behave as one primary controller. Once the redundant configuration takes effect, user configurations and settings can be done only on the primary controller. The secondary controller then synchronizes with the configuration of the primary controller, making the configurations of the two controllers exactly the same.

  The two controllers continuously monitor each other. When a controller detects that the other controller is not responding, the working controller immediately takes over and disables the failed controller.
- It is necessary to connect all interfaces to both controllers so that the surviving controller can readily continue all services provided for the RAID system. For example, if you connect one controller to the Ethernet, you should also connect the second controller to the Ethernet.
- In an active-to-active configuration (standard configuration), you can assign any appropriate logical drives to either of the controllers, and then map the logical configurations to host channel IDs/LUNs. I/O requests from host computer are directed to the primary or the secondary controller accordingly. The total drive capacity can be grouped into several logical configurations and equally assigned to both controllers so that they share the workload.

  The active-to-active configuration engages all array resources to actively maximize performance. Users might also assign all logical configurations to one controller and let the other act as a standby.
- An active-to-standby configuration is an available configuration but it is not usually selected. By assigning all the logical configurations of drives to one controller, the other controller stays idle and becomes active only when its counterpart fails.

5.2 Battery Operation

The battery LED (on far right side of the controller module) is a yellow LED if the battery is bad or missing. The LED is blinking green if the battery is charging and is solid green when the battery is fully charged.

5.2.1 Battery Status

The initial firmware screen displays the battery status at the top of the initial screen where BAT: status displays somewhere in the range from BAD to ----- (charging), or +++++ (fully charged). For example, a partially charged battery may show +++--.

Battery modules can support cache memory for 72 hours.

Your lithium battery should be changed every two years if the unit is continuously operated at 25 degrees C. If the unit is continuously operated at 35 degrees C or higher, it should be changed every year. The shelf life of your battery is three years.

For information on the date of manufacture and how to replace the battery module, refer to the *Sun StorEdge 3000 Family FRU Installation Guide*.

Note – A safety precaution designed into your battery circuitry causes the battery to stop charging when the temperature of your array exceeds certain limits. When this happens, the battery status may be reported as BAD, but no alarm is written to the event log since no actual battery failure has occurred. This behavior is normal. As soon as the temperature returns to the normal range, battery charging resumes and the battery status is reported correctly. It is not necessary to replace or otherwise interfere with the battery in this situation.

For more information, see “Environmental Requirements” on page 2-3 for the acceptable operating and non-operating temperature ranges for your array.

5.3 Write Back Versus Write Through Cache Options

Unfinished writes are cached in memory in write-back mode. If power to the array is discontinued, data stored in the cache memory is not lost. Battery modules can support cache memory for several days.

Write cache is not automatically disabled when the battery is offline due to battery failure or a disconnected battery. You can enable or disable the write-back cache capabilities of the RAID controller. To ensure data integrity, you may choose to disable Write Back cache option and switch to the Write Through cache option through the firmware application (go to “view and edit Configuration parameters” and select “Caching Parameters”). The risk of data loss is remote.

5.4 Accessing the Management Tools

You can manage the array through one of the following three methods:

- With the out-of-band serial port connection, you can use a Solaris `tip` session or a Windows terminal emulation program to access the firmware application. For details, refer to “Setting Up the Serial Port Connection” on page 5-6.
- With the out-of-band Ethernet port connection, you can use telnet to access the firmware application. For details, refer to “Ethernet Connection” on page C-1.
- With in-band SCSI host connections, you can use the Sun StorEdge Configuration Service software or CLI software. Refer to the *Sun StorEdge 3000 Family Configuration Service 1.2 User Guide* for in-band setup procedures.

5.5 First-Time Controller Configuration

Sun StorEdge 3310 SCSI arrays are preconfigured and require minimal configuration. TABLE 5-1 summarizes the typical series of procedures for completing a first-time RAID controller configuration. All other procedures can be performed by using either the COM port or the Ethernet port connection to a management console.

TABLE 5-1 Summary of First-Time Controller Configuration Steps

	Bold = Required minimum configuration
1.	**Cabling from the RAID array to host(s) must be complete.**
2.	**Set up serial port connection.**
3.	Configure SCSI channels as host or drive (optional).
4.	Create primary ID and secondary ID on host channel(s).
5.	Reset controller. The IDs assigned to controllers only take effect after controller is reset.
6.	Remove default logical drive(s) and create new logical drives (optional).
7.	Assign logical drives to the secondary controller (optional).
8.	Repartition the logical drive(s) (optional).
9.	**Map each logical drive partition to a LUN on a host channel.**
10.	**Reset controller.** *
	Configuration is complete.
11.	Save configuration to disk.
	* Reset the controller after each step or at the end of the configuration process.

Note – Resetting the controller can result in occasional host-side error messages such as parity error and synchronous error messages. No action is required and the condition corrects itself as soon as reinitialization of the controller is complete.

Caution – You should not use both in-band and out-of-band connections at the same time to manage the array or you might cause conflicts between multiple operations.

5.5.1 Setting Up the Serial Port Connection

The RAID controller can be configured by means of a workstation running a VT-100 terminal emulation program or by a Windows terminal emulation program such as HyperTerminal.

Note – You can also monitor and configure a RAID array over an IP network with the Sun StorEdge Configuration Service program after you assign an IP address to the array. For details, refer to "Ethernet Connection" on page C-1 and to the *Sun StorEdge 3000 Family Configuration Service User's Guide.*

---

1. **Use a serial cable to connect the COM port of the RAID array to a serial port on a workstation.**

   A DB9-to-DB25 serial cable adapter is provided to connect the serial cable to DB25 serial ports on workstations.

   Make sure that a null modem cable can be attached to the host serial port. The null modem cable has serial signals swapped for connecting to a standard serial interface.

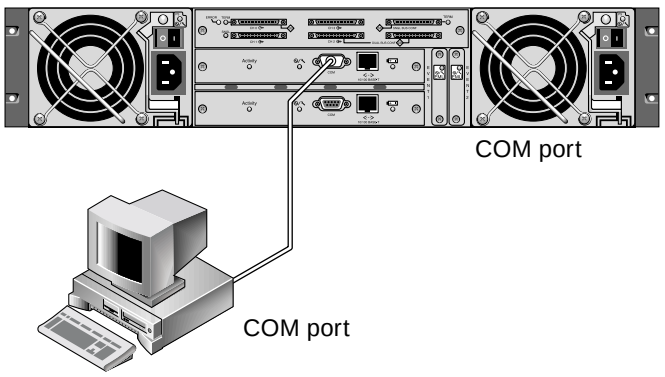


FIGURE 5-1 RAID Array COM Port Connected Locally to the COM Port of a Workstation or Computer Terminal

2. **Power up the array.**

3. **Set the serial port parameters on the workstation as follows: 38400 baud, 8 bit, 1 stop bit, no parity, no flow control.**

   For additional information on how to set serial port parameters on a specific server, refer to:

   - "Configuring a Server Running the Solaris Operating Environment" on page F-1.
   - "Configuring a Windows 2000 Server" on page G-1.

- “Configuring a Linux Server” on page H-1.
- “Configuring an IBM Server Running the AIX Operating Environment” on page I-1.
- “Configuring an HP Server Running the HP-UX Operating Environment” on page J-1.
- “Configuring a Windows NT Server” on page K-1

5.5.2 Viewing the Initial Firmware Windows

You see the initial controller screen (FIGURE 5-2) when you first access the RAID controller firmware.

The initial screen is displayed when the RAID controller is powered-on. Use the up and down arrow keys to select the desired VT100 terminal emulation mode, and then press Return to enter the Main Menu.

If the null modem serial cable is connected while the controller is powered on, press Ctrl-l (Ctrl key + letter el) to refresh the screen information.

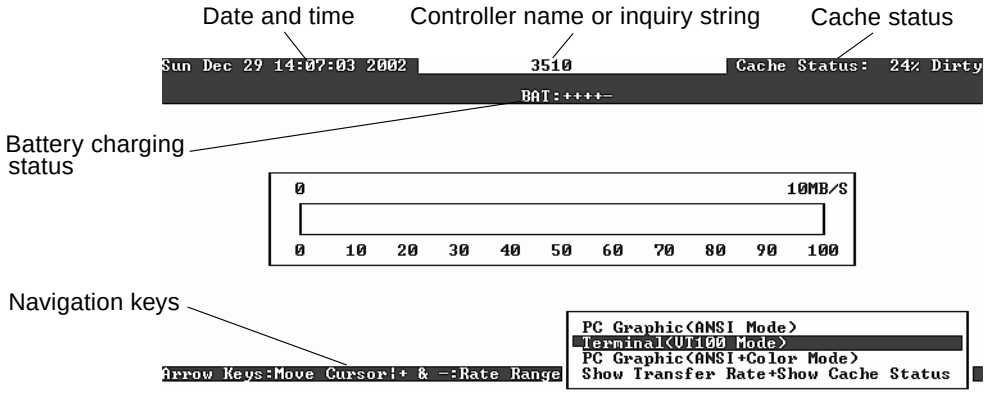


FIGURE 5-2 Initial Screen of the Terminal Emulation Application

1. **Use the following keys to navigate within the application:**

← → ↑ ↓	To select options
Select	To go to a submenu or to execute a selected option
Esc	To escape and go back to the previous menu
Ctrl-l (Ctrl key and letter l)	To refresh the screen information

2. **Proceed to configure the array as needed, from the Main Menu.**

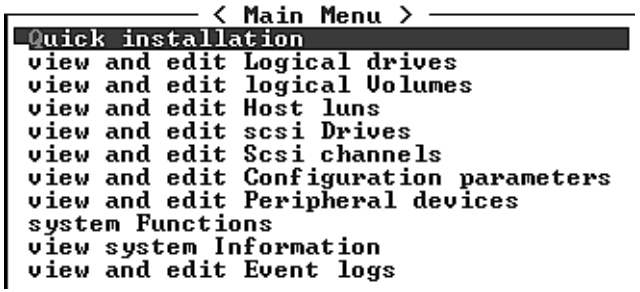

< Main Menu >
Quick installation
view and edit Logical drives
view and edit logical Volumes
view and edit Host luns
view and edit scsi Drives
view and edit Scsi channels
view and edit Configuration parameters
view and edit Peripheral devices
system Functions
view system Information
view and edit Event logs

FIGURE 5-3 Firmware Main Menu

5.5.3 Configuring SCSI Channels as Host or Drive (Optional)

All Sun StorEdge 3310 SCSI RAID arrays are preconfigured when they arrive from the factory. Default channel settings and rules are specified as follows:

- Channel 0 (CH 0) must be a drive channel.
- Channels 1, 2, and 3 (CH 1, CH 2, CH 3) might be drive or host channels.
- Default channel settings are:
  - CH 0 and CH 2 = Drive channels
  - CH 1 and CH 3 = Host channels

The most common reason to change a host channel to a drive channel is to attach an expansion unit to a RAID array when you need only one host channel.

To change the use of a SCSI channel, reconfigure the channel according to the following procedure.

1. **Select “view and edit Scsi channels” from the Main Menu.**

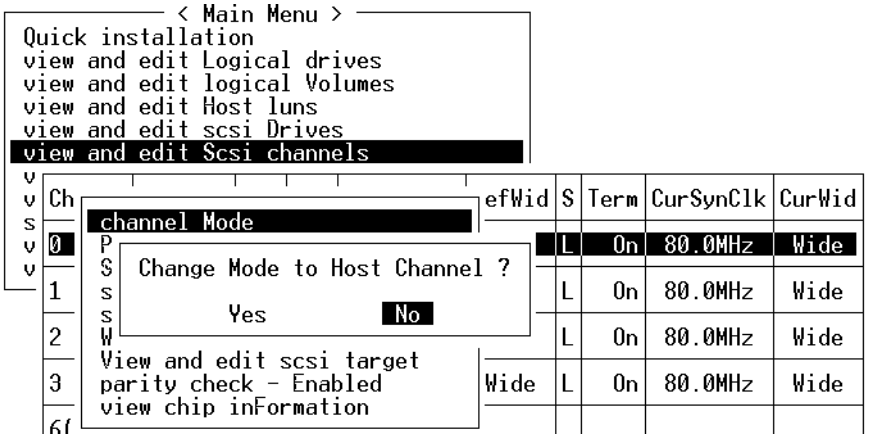
< Main Menu >
Quick installation
view and edit Logical drives
view and edit logical Volumes
view and edit Host luns
view and edit scsi Drives
view and edit Scsi channels

Chl	Mode	PID	SID	DefSynClk	DefWid	S	Term	CurSynClk	CurWid
0	Drive	7	6	80.0MHz	Wide	L	On	80.0MHz	Wide
1	Host	0		80.0MHz	Wide	L	On	80.0MHz	Wide
2	Drive	7	6	80.0MHz	Wide	L	On	80.0MHz	Wide
3	Host	NA	2	80.0MHz	Wide	L	On	80.0MHz	Wide
6(D)	RCCOM								

The communications path for the controllers is displayed as “RCCOM (Redundant Controller Communications).”

2. **Highlight the channel that you want to modify, and press Return.**

   Use the arrow key to select Yes if you want to change the host or drive assignment.



Caution – The channels of redundant controllers must be the same. For example, if the primary controller uses channel 2 to connect to a group of drives, the secondary controller must also use channel 2 to connect to the same group of drives. Changes to the primary controller are automatically made to the secondary controller.

5.5.4 Creating Additional Host IDs (Optional)

All RAID arrays are preconfigured when they arrive from the factory.

Default host channel IDs are:

- Channel 1 ID 0 (primary controller)
- Channel 3 ID 1 (secondary controller)

Each host channel might have two editable ID numbers:

- Primary controller ID
- Secondary controller ID

Each ID number must be a unique number within the host channel. You can:

- Edit each host ID number to change the SCSI target number of each controller host channel that is seen by the host.

- Add additional host ID numbers (by adding a second host ID to channels 1 and 3, and additional host IDs if you make Channel 2 into a host channel).

Note – To map 128 partitions into 128 LUNs, you must add additional host IDs. A minimum of four host IDs are required; a maximum of six host IDs are possible. For details on mapping 128 LUNs, refer to “Planning for 128 LUNs (Optional)” on page 5-25.

To select a unique ID number for a host channel:

1. **Select “view and edit Scsi channels.”**

   Press Return.

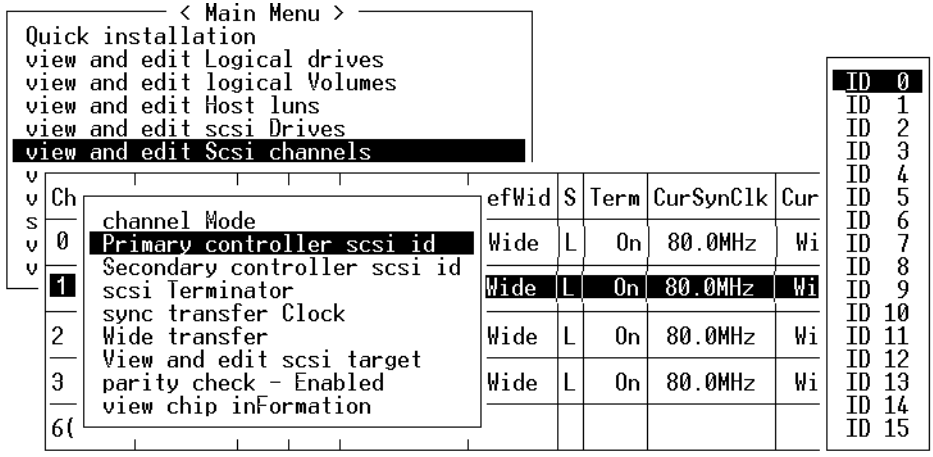
2. **Highlight the host channel on which you want to edit the Primary/Secondary ID, and press Return.**

   Press Return to access the list of IDs and use the arrow keys to select an ID number (0 through 15), then press Return again.

3. **Select “view and edit scsi Id” and press Return.**

4. **Select “Add Channel SCSI ID.”**

5. **Select the controller on which you want to add a host ID.**



6. **Type an ID number for that controller.**

Note – To create a total of 128 LUNs, you must have a minimum of four host IDs (two each for Channels 1 and 3) and might have a maximum of six host IDs (two each for Channels 1 and 2, and 3). Each host ID can have up to 32 partitions, which are then mapped to LUNs to create a total not to exceed 128.

7. **From the Main Menu, select "System Functions," then "Reset controller."**

   The configuration change takes effect only after the controller is reset.

5.5.5 Selecting Sequential or Random Optimization

Before creating or modifying logical drives, you should select the optimization mode for all logical drives you create. The optimization mode determines the block size used when writing data to the drives in an array. Sequential I/O uses large blocks of data (128 Kbyte). Random I/O uses small blocks of data (32 Kbyte).

The type of application the array is working with determines whether Random or Sequential I/O should be applied. Video/imaging application I/O size can be 128, 256, 512 Kbyte, or up to 1 Mbyte, so the application reads and writes data to and from the drive as large-block, sequential files. Database/transaction-processing applications read and write data from the drive as small-block, randomly-accessed files.

There are two limitations that apply to the optimization modes:

- One optimization mode must be applied to all logical drives in an array.
- Once the optimization mode is selected and data written to logical drives, the only way to change the optimization mode is to back up all data to another location, delete all logical configurations of drives, reconfigure the logical drive with the new optimization mode, and reboot the array.

Note – The maximum allowable size of a logical drive optimized for Sequential I/O is 2 Tbyte. The maximum allowable size of a logical drive optimized for Random I/O is 512 Gbyte. When creating a logical drive that is greater than these limits, an error message is displayed.

For more information about optimization modes, including how to change your optimization, refer to the *Sun StorEdge 3000 Family RAID Firmware User's Guide* for your array.

5.5.5.1 Maximum Number of Disks and Maximum Usable Capacity for Random and Sequential Optimization

Your choice of Random or Sequential optimization affects the maximum number of disks you can include in an array and the maximum usable capacity of a logical drive. The following tables contain the maximum number of disks per logical drive and the maximum usable capacity of a logical drive.

Note – You can have a maximum of eight logical drives and 36 disks, using one array and two expansion units.

TABLE 5-2 Maximum Number of Disks per Logical Drive for a 2U Array

Disk Capacity (GB)	RAID 5 Random	RAID 5 Sequential	RAID 3 Random	RAID 3 Sequential	RAID 1 Random	RAID 1 Sequential	RAID 0 Random	RAID 0 Sequential
36.2	14	31	14	31	28	36	14	36
73.4	7	28	7	28	12	30	6	27
146.8	4	14	4	14	6	26	3	13

TABLE 5-3 Maximum Usable Capacity (Gbyte) per Logical Drive for a 2U Array

Disk Capacity	RAID 5 Random	RAID 5 Sequential	RAID 3 Random	RAID 3 Sequential	RAID 1 Random	RAID 1 Sequential	RAID 0 Random	RAID 0 Sequential
36.2	471	1086	471	1086	507	543	507	1122
73.4	440	1982	440	1982	440	1101	440	1982
146.8	440	1908	440	1908	440	1908	440	1908

Note – You might not be able to use all disks for data when using 36 146-Gbyte disks. Any remaining disks can be used as spares.

5.5.6 Reviewing Default Logical Drives and RAID Levels

A logical drive is a set of drives grouped together to operate under a given RAID level. Each controller is capable of supporting as many as eight logical drives. The logical drives can have the same or different RAID levels.

- A logical drive can be further divided into a maximum of 32 partitions.
- The total number of partitions must not exceed 128 partitions per RAID array. To create a maximum of 128 partitions, refer to "Planning for 128 LUNs (Optional)" on page 5-25.

For a 12-drive array, the RAID array is preconfigured as follows:

- Two RAID 5 logical drives, consisting of five physical drives in each logical drive
- Two global spares

For a 5-drive array, the RAID array is preconfigured as follows:

- One RAID 5 logical drive, consisting of four physical drives
- One global spare

The following table highlights the RAID levels available.

TABLE 5-4 RAID Level Definitions

RAID Level	Description
RAID 0	Striping without data redundancy; provides maximum performance.
RAID 1	Mirrored or duplexed disks; for each disk in the system, a duplicate disk is maintained for data redundancy. It requires 50% of total disk capacity for overhead.
RAID 3	Striping with dedicated parity. Parity is dedicated to one drive. Data is divided into blocks and striped across the remaining drives.
RAID 5	Striping with distributed parity; this is the best-suited RAID level for multi-tasking or transaction processing.The data and parity are striped across each drive in the logical drive, so that each drive contains a combination of data and parity blocks.
NRAID	NRAID stands for Non-RAID. The NRAID option in the firmware application is no longer used and is not recommended.
RAID 1+0	RAID 1+0 combines RAID 1 and RAID 0—mirroring and disk striping. RAID 1+0 allows multiple drive failure because of the full redundancy of the hard disk drives. If four or more hard disk drives are chosen for a RAID 1 logical drive, RAID 1+0 is performed automatically.

TABLE 5-4 RAID Level Definitions *(Continued)*

RAID Level	Description
RAID (3+0)	A logical volume with several RAID 3 member logical drives.
RAID (5+0)	A logical volume with several RAID 5 member logical drives.

For more information about logical drives, spares, and RAID levels, refer to Chapter 1, Basic Concepts, in the *Sun StorEdge 3000 Family RAID Firmware 3.25 User's Guide.*

5.5.7 Completing Basic Configuration

- Optionally define any additional partitions for each logical drive. Refer to "Partitioning a Logical Drive (optional)" on page 5-22.
- Optionally add host SCSI IDs and more logical drives to create 128 LUNs. Refer to:
  - "Planning for 128 LUNs (Optional)" on page 5-25,
  - "Creating Additional Host IDs (Optional)" on page 5-10,
  - "Creating Logical Drive(s) (optional)" on page 5-15.
- Map the logical drive(s) to the host LUNs (required). Refer to"Mapping Logical Drive Partitions to Host LUNs" on page 5-27.

5.5.8 Creating Logical Drive(s) (optional)

The RAID array is already configured with one or two RAID 5 logical drives and one global spare. Each logical drive consists of a single partition by default.

This procedure is used to modify the RAID level and to add more logical drives, if necessary. In this procedure, you configure a logical drive to contain one or more hard drives based on the desired RAID level, and partition the logical drive into additional partitions.

Note – If you want to assign 128 partitions to 128 LUNs in an array, you need to have a minimum of four logical drives (each with 32 partitions).

For redundancy across separate channels, you can also create a logical drive containing drives distributed over separate channels. You can then partition the logical unit into one or several partitions.

A *logical drive* consists of a group of SCSI drives. Each logical drive can be configured a different RAID level.

A drive can be assigned as the *local spare drive* to one specified logical drive, or as a *global spare drive* that is available to all logical drives on the RAID array. Spares can be part of automatic array rebuild. A spare is not available for logical drives with no data redundancy (NRAID and RAID 0).

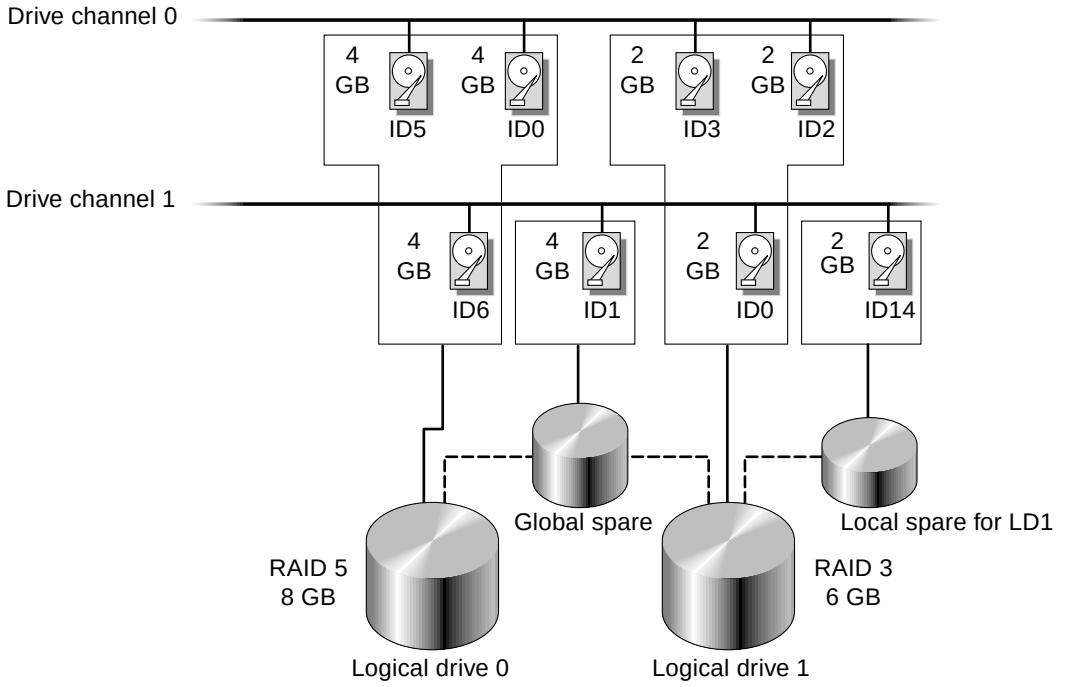


FIGURE 5-4 Example Allocation of Local and Spare Drives in Logical Configurations

1. **View the connected drives.**

   Before configuring disk drives into a logical drive, it is necessary to understand the status of physical drives in your enclosure.

   a. **Use the arrow keys to scroll down to "view and edit Scsi drives" and press Return.**

      This displays information of all the physical drives that are installed.

Quic	Slot	Chl	ID	Size(MB)	Speed	LG_DRV	Status	Vendor and Product ID
view								
view		0	0	70007	160MB	0	ON-LINE	SEAGATE ST373405LC
view								
view		0	1	70007	160MB	0	ON-LINE	SEAGATE ST373405LC
view								

b. Use the arrow keys to scroll through the table. Check that all installed drives are listed here.

If a drive is installed but is not listed, it might be defective or might not be installed correctly, contact your RAID supplier.

When the power is on, the controller scans all hard drives that are connected through the drive channels. If a hard drive was connected after the controller completed initialization, use the "Scan SCSI Drive" function to let the controller recognize the newly added hard drive and configure it as a member of a logical drive.

Caution – Scanning an existing drive removes its assignment to any logical drive. All data on that drive is lost.

2. Create a logical drive with the following steps.

a. Scroll through the Main Menu and select "view and edit Logical drive."

Q	LG	ID	LV	RAID	Size(MB)	Status	0	#LN	#SB	#FL	NAME
v	0			NONE							
v	1			NONE							
v	2			NONE							
v	3			NONE							
v	4			NONE							
v	5			NONE							
v	6			NONE							
v	7			NONE							
v											
s											
v											
v											

b. Select the first available unassigned logical drive (LG) and press Return to proceed.

You can create as many as eight logical drives from drives on any SCSI bus.

When prompted to "Create Logical Drive?" select Yes and press Return to proceed.

A pull-down list of supported RAID levels is displayed.

3. **Select a RAID level for this logical drive.**

   RAID 5 is used in the following example screens.

   For brief descriptions of RAID levels, refer to “Reviewing Default Logical Drives and RAID Levels” on page 5-14. For more information about RAID levels, refer to Chapter 1 in the *Sun StorEdge 3000 Family RAID Firmware 3.25 User’s Guide.*

4. **Select your member drive(s) from the list of available physical drives.**

   The drives can be tagged for inclusion by highlighting the drive and then pressing Return. An asterisk (*) mark is displayed on the selected physical drive(s).

   To deselect the drive, press Return again on the selected drive. The “*” mark disappears.

Note – You must select at least the minimum number of drives required per RAID level.

---

   a. **Use the up and down arrow keys to select more drives.**

LG	ID		LV	RAID	Size(MB)	Status	O	#	RAID 5	NAME
0	Slot	Chl	ID	Size(MB)	Speed	LG_DRV	Status		Vendor and Product ID	
1		2	0	9999	40MB	NONE	NEW DRV		SEAGATE ST31055W	
2		2	1	9999	40MB	NONE	NEW DRV		SEAGATE ST31055W	
3		2	2	9999	40MB	NONE	NEW DRV		SEAGATE ST31055W	
4		2	4	9999	40MB	NONE	NEW DRV		SEAGATE ST31055W	
5				NONE						
6				NONE						
7				NONE						

b. After all physical drives have been selected for the logical drive, press Esc key to continue to the next option.

After member physical drives are selected, a list of selections is displayed.

5. Optionally set Maximum Physical Drive Capacity and assign spares.

a. Optionally select "Maximum Drive Capacity" from the menu, and press Return.

Note – Changing the maximum drive capacity reduces the size of the logical drive and leave some disk space unused.

As a rule, a logical drive should be composed of physical drives with the same capacity. A logical drive can only use the capacity of each drive up to the maximum capacity of the smallest drive.

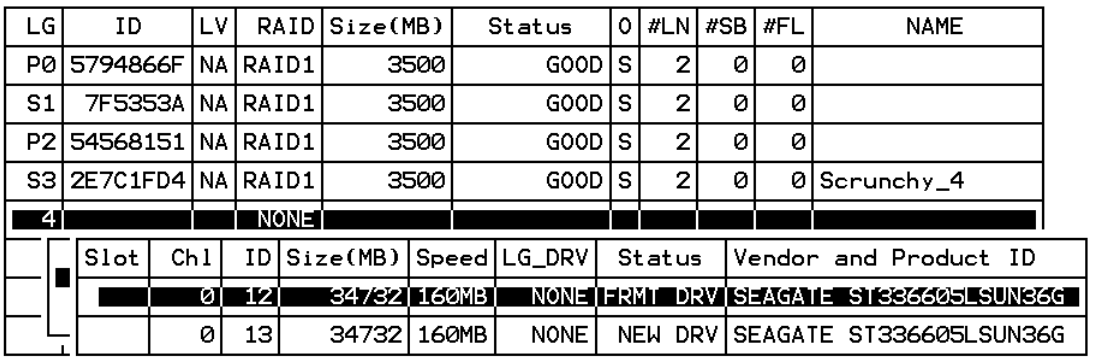
b. Optionally add a local spare drive from the list of unused physical drives.

Note – A global spare cannot be created while creating a logical drive.

The spare chosen here is a local spare and automatically replaces any failed disk drive in this logical drive. The local spare is not available for any other logical drive.

LG	ID	LV	RAID	Size(MB)	Status	O	#LN	#SB	#FL	NAME
P0	5794866F	NA	RAID1	3500	GOOD	S	2	0	0	
S1	7F5353A	NA	RAID1	3500	GOOD	S	2	0	0	
P2	54568151	NA	RAID1	3500	GOOD	S	2	0	0	
S3	2E7C1FD4	NA	RAID1	3500	GOOD	S	2	0	0	Scrunchy_4
4			NONE							

Maximum Drive Capacity : 34476MB
Assign Spare Drives
Disk Reserved Space: 256 MB
Logical Drive Assignments


LG ID LV RAID Size(MB) Status O #LN #SB #FL NAME
P0 5794866F NA RAID1 3500 GOOD S 2 0 0
S1 7F5353A NA RAID1 3500 GOOD S 2 0 0
P2 54568151 NA RAID1 3500 GOOD S 2 0 0
S3 2E7C1FD4 NA RAID1 3500 GOOD S 2 0 0 Scrunchy_4
4 NONE
Slot Chl ID Size(MB) Speed LG_DRV Status Vendor and Product ID
0 12 34732 160MB NONE FRMT DRV SEAGATE ST336605LSUN36G
0 13 34732 160MB NONE NEW DRV SEAGATE ST336605LSUN36G

Note – A logical drive created in a RAID level which has no data redundancy (NRAID or RAID 0) does not support spare drive rebuilding.

---

6. **Optionally select “Logical Drive Assignments” to assign this logical drive to the secondary controller.**

   By default, all logical drives are automatically assigned to the primary controller.

Redundant Controller Logical Drive Assign to Secondary Controller ?

Yes No

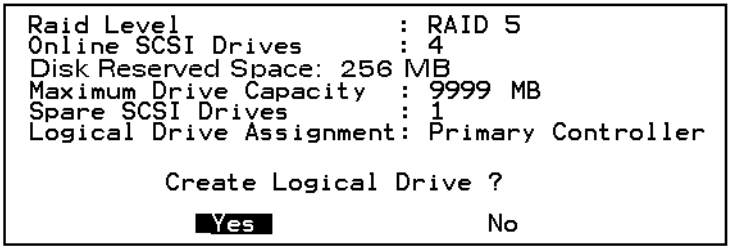
   If you use two controllers for the redundant configuration, a logical drive can be assigned to either of the controllers to balance workload. Logical drive assignment can be changed any time later.

   a. **Press Esc key or No to exit from this window without changing the controller assignment.**

b. Select “Yes,” press Return to confirm, and then press Esc key to continue when all the preferences have been set.

A confirmation box is displayed on the screen.

c. Verify all information in the box before choosing “Yes” to proceed.


Raid Level : RAID 5
Online SCSI Drives : 4
Disk Reserved Space: 256 MB
Maximum Drive Capacity : 9999 MB
Spare SCSI Drives : 1
Logical Drive Assignment: Primary Controller
Create Logical Drive ?
Yes
No

A message indicates that the logical drive initialization has begun.

d. Press Esc key to cancel the “Notification” prompt.

e. After the logical drive initialization is completed, use the Esc key to return to the Main Menu.

7. Select “view and edit Logical drives” to view details of the created logical drive.

5.5.9 Changing a Logical Drive Controller Assignment (Optional)

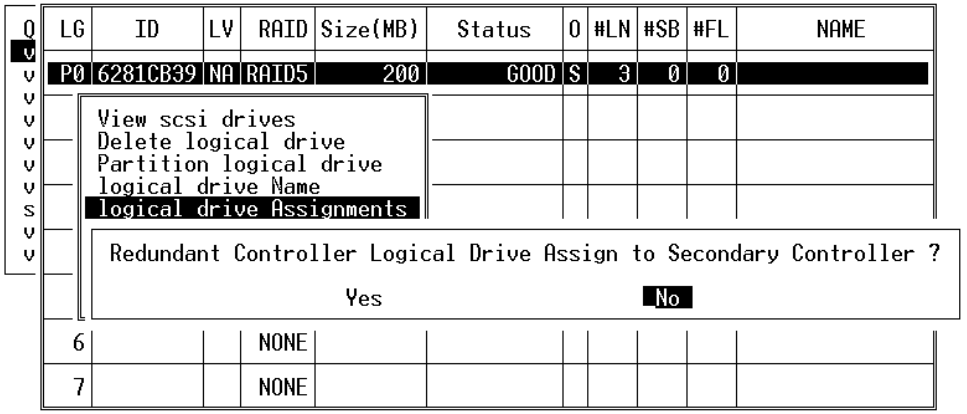
By default, logical drives are automatically assigned to the primary controller. If you assign half the drives to the secondary controller, the maximum speed and performance is somewhat improved due to the redistribution of the traffic.

To balance the workload between both controllers, you can distribute your logical drives between the primary controller (displayed as the Primary ID or PID) and the secondary controller (displayed as the Secondary ID or SID).

After a logical drive has been created, it can be assigned to the secondary controller. Then the host computer associated with the logical drive can be mapped to the secondary controller (see “Mapping Logical Drive Partitions to Host LUNs” on page 5-27).

1. To change a logical drive controller assignment, select “view and edit Logical drives” from Main Menu, and press Return.

2. Select “logical drive assignments” and press Return.


LG ID LV RAID Size(MB) Status 0 #LN #SB #FL NAME
P0 6281CB39 NA RAID5 200 GOOD S 3 0 0
View scsi drives
Delete logical drive
Partition logical drive
logical drive Name
logical drive Assignments
Redundant Controller Logical Drive Assign to Secondary Controller ?
Yes
No
6 NONE
7 NONE

The reassignment is evident from the “view and edit Logical drives” screen.

A “P” in front of the LG number means that the logical drive is assigned to the primary controller. An “S” in front of the LG number means that the logical drive is assigned to a secondary controller.

For example, “S1” indicates that logical drive 1 assigned to the secondary controller.

Note – The editable logical drive NAME name is used only in the RAID firmware administration and monitoring, and does not appear anywhere on the host. You can create a logical drive NAME after the logical drive is created: Select the logical drive in the previous screen, and press Return. Then select “logical drive name,” type the desired name, and press Return.

---

3. **Press Esc to return to the Main Menu.**

4. **Reset the controller to implement the change.**

   Select “system Functions” on the Main Menu. Then select “Reset controller” and press Return.

   You must reset the controller for the changes to take effect.

5.5.10 Partitioning a Logical Drive (optional)

You might divide a logical drive into several partitions, or use the entire logical drive as a single partition. You might configure up to 32 partitions for each logical drive.

For guidelines on setting up 128 LUNs, refer to “Planning for 128 LUNs (Optional)” on page 5-25.

Caution – If you modify the size of a partition or logical drive, you lose all data on those drives.

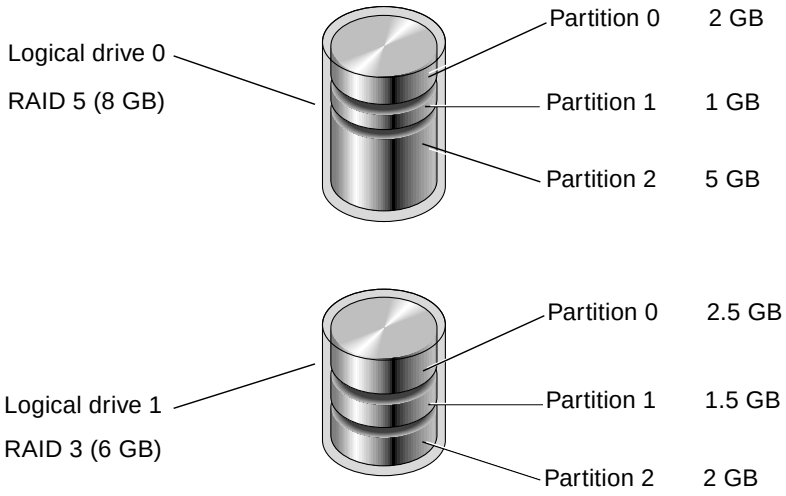


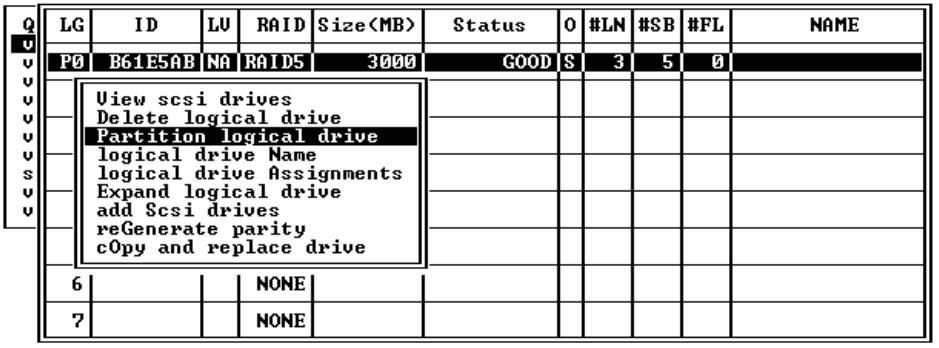
FIGURE 5-5 Partitions in Logical Configurations

To partition a logical drive, perform the following steps.

1. **From the Main Menu, select "view and edit Logical drives."**
2. **Select the logical drive you want to partition, then press Return.**

LG	ID	LV	RAID	Size(MB)	Status	O	#LN	#SB	#FL	NAME
P0	B61E5AB	NA	RAID5	3000	GOOD	S	3	5	0	
1			NONE							

3. **Select "Partition logical drive" from the menu, then press Return.**


LG ID LV RAID Size(MB) Status O #LN #SB #FL NAME
P0 B61E5AB NA RAID5 3000 GOOD S 3 5 0
View scsi drives
Delete logical drive
Partition logical drive
logical drive Name
logical drive Assignments
Expand logical drive
add Scsi drives
reGenerate parity
cOpy and replace drive
6 NONE
7 NONE

4. **Select from the list of undefined partitions and press Return.**

   This message is displayed:

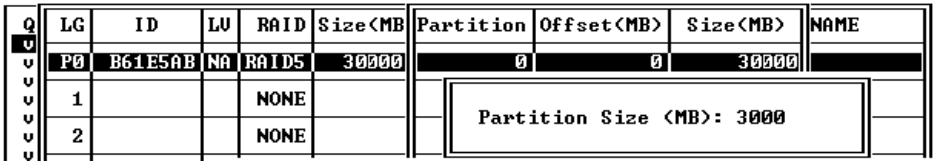
```
Partitioning the Logical Drive will make it no longer eligible for
membership in a logical volume.

Continue Partition Logical Drive?
```

Note – For information and procedures about logical volumes, refer to the *Sun StorEdge 3000 Family RAID Firmware 3.25 User's Guide.*

   A list of the partitions for this logical drive appears. If the logical drive has not yet been partitioned, all the logical drive capacity is listed as "partition 0."

5. **Press Return and type the desired size for the selected partition, and then press Return to proceed.**


LG ID LV RAID Size(MB Partition Offset(MB) Size(MB) NAME
P0 B61E5AB NA RAID5 30000 0 0 30000
1 NONE
2 NONE
Partition Size (MB): 3000

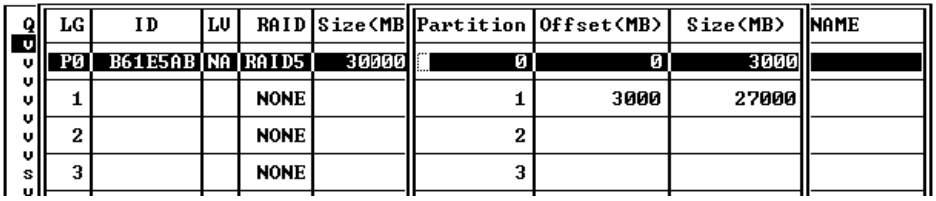
   A warning prompt is displayed:

```
This operation will result in the loss of all data on the partition.
Partition Logical Drive?
```

Caution – Make sure any data on this partition that you want to save has been backed up before you partition the logical drive.

6. **Select Yes and press Return to confirm.**

   The remaining capacity of the logical drive is automatically allotted to the next partition. In the following figure, a partition size of 3000MB was entered; the remaining storage of 27000 MB is allocated to the partition below the partition created.



LG	ID	LV	RAID	Size(MB	Partition	Offset(MB)	Size(MB)	NAME
P0	B61E5AB	NA	RAID5	30000	0	0	3000	
1			NONE		1	3000	27000	
2			NONE		2			
3			NONE		3			

7. **Repeat the preceding steps to partition the remaining capacity of your logical drive.**

   You can create up to 32 partitions per logical drive, with a total number of partitions not to exceed 128 partitions/LUNs per the RAID array.

Note – When you modify a partition or logical drive size, you must re-configure all host LUN mappings. All the host LUN mappings are removed with any change to partition capacity. See “Mapping Logical Drive Partitions to Host LUNs” on page 5-27.

Note – When a partition of logical drive/logical volume is deleted, the capacity of the deleted partition is added to the partition above the deleted partition.

5.5.11 Planning for 128 LUNs (Optional)

If you want to create 128 LUNs which is the maximum number of storage partitions which can be mapped for a RAID array, set up one of the following configurations:

- Create four host IDs. Create four logical drives. Partition each logical drive into 32 partitions (4 times 32 = 128). Map the 128 partitions to the four host IDs. This is the most commonly used configuration.

  or

- Create six host IDs (this requires three host drives), perform one of the following steps, and then map the 128 partitions to the 6 host IDs.
  - Create 4 logical drives of 32 partitions each
  - Create 5 logical drives with total number of partitions equaling 128 (four logical drives with 25 partitions each and one with 28 partitions)
  - Create 6 logical drives (5 logical drives with 21 partitions each and 1 with 23 partitions).

For details on how to add host IDs, refer to “Creating Additional Host IDs (Optional)” on page 5-10.

Note – For an overview of how partitions, LUNs, and host IDs work, refer to “Mapping Logical Drive Partitions to Host LUNs” on page 5-27.

To set up 128 LUNs, the following steps are required.

1. **Create a minimum of four host IDs.**

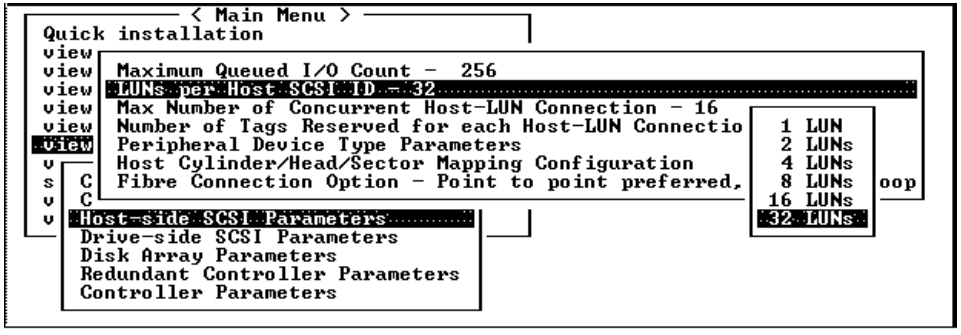
   By default, you have two host IDs: Channel 1 ID 0 (primary controller) and Channel 3 ID 1 (secondary controller). You can have a total of two IDs per channel, one for the Primary Controller and one for the secondary controller.

   For the detailed procedure, refer to “Creating Additional Host IDs (Optional)” on page 5-10.

2. **Confirm that the allowed number of LUNs per host ID is 32.**

   Go to “view and edit Configuration parameters,” and select “host-side SCSI Parameters.”

   If the “LUNs per Host SCSI ID” is not 32, highlight the line, press Return and select the number 32.



3. **Create at least four logical drives.**

   For the detailed procedure, refer to “Creating Logical Drive(s) (optional)” on page 5-15.

4. **For each logical drive, create a number of partitions per logical drive until you reach a total of 128 partitions, then map those partitions to the host IDs.**

   For the detailed procedures, refer to “Partitioning a Logical Drive (optional)” on page 5-22 and “Mapping Logical Drive Partitions to Host LUNs” on page 5-27.

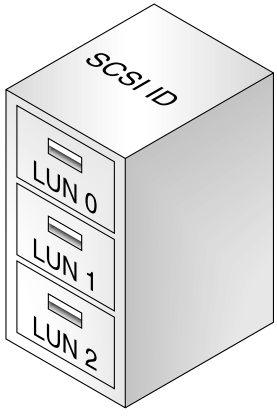
5.5.12 Mapping Logical Drive Partitions to Host LUNs

The next step is to map each storage partition as one system drive (host ID/LUN). The host SCSI adapter recognizes the system drives after re-initializing the host bus.

A SCSI channel (SCSI bus) can connect up to 15 devices (excluding the controller itself) when the Wide function is enabled (16-bit SCSI). Each device has one unique ID.

The following figure illustrates the idea of mapping a system drive to host ID/LUN combination.

- The SCSI ID is like a cabinet, and the drawers are the LUNs (LUN is short for logical unit number).
- Each cabinet (SCSI ID) can have up to 32 drawers (LUNs).
- Data can be stored into one of the LUNs of the SCSI ID. Most SCSI host adapters treat a LUN like another SCSI device.
- The maximum number of LUNs which can be created for a RAID array is 128. To create a total of 128 LUNs, refer to “Planning for 128 LUNs (Optional)” on page 5-25.



Each SCSI ID/LUN looks like a storage device to the host computer.

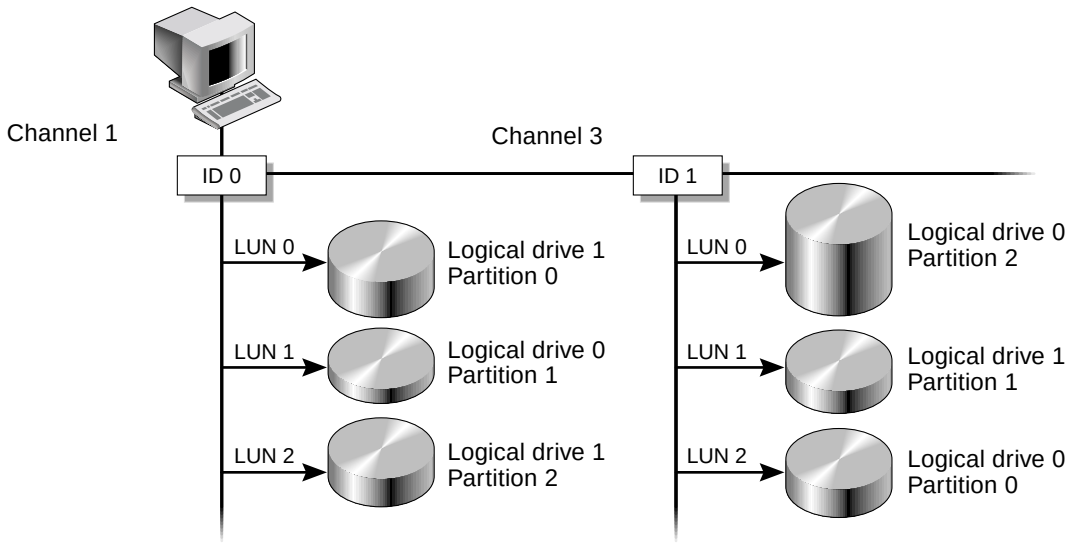
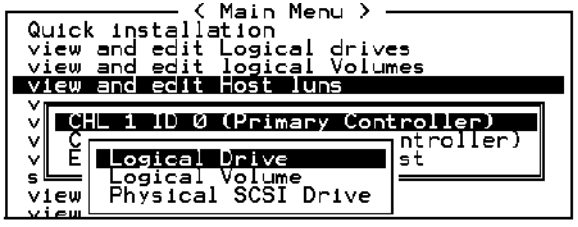


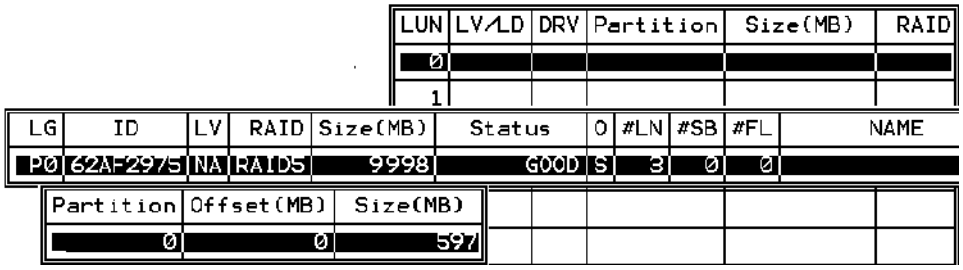
FIGURE 5-6 Mapping Partitions to Host ID/LUNs

To map a logical drive partition to a LUN, perform the following steps.

1. **On the Main Menu, select "view and edit Host luns."**
2. **Select a specific host-channel ID and press Return. Select a logical drive if prompted.**

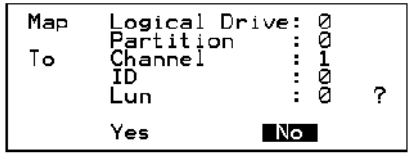


3. **Select a LUN number, and press Return. Select a logical drive, then highlight a partition, and press Return.**


LUN LV/LD DRV Partition Size(MB) RAID
0
1
LG ID LV RAID Size(MB) Status O #LN #SB #FL NAME
P0 62A-2975 NA RAID5 9998 GOOD S 3 0 0
Partition Offset(MB) Size(MB)
0 0 597

4. **Select "Map Host LUN."**

5. **Confirm the mapping scheme by selecting "Yes."**



   The same partition might be mapped to multiple LUNs on multiple host channels. This feature is necessary for clustered environments and redundant path environments.

6. **Press Esc key to return to the Main Menu.**

7. **Repeat Step 1 through Step 6 for each partition until all partitions are mapped to a LUN.**

8. **Select "system Functions" on the Main Menu, and select "Reset controller" to implement the new configuration settings.**

9. **To verify unique mapping of each LUN (unique LUN number, unique DRV number, or unique Partition number), select the "view and edit Host luns" command and press Return.**

10. **Each operating system or environment has a method for recognizing storage devices and LUNs, and may require the use of specific commands or modification of specific files. Be sure to check the information for your operating system/environment to ensure that you have performed the necessary commands or file edits.**

    For information about the different operating environments and operating systems, see:

- “Configuring a Server Running the Solaris Operating Environment” on page F-1.
- “Configuring a Windows 2000 Server” on page G-1.
- “Configuring a Linux Server” on page H-1.
- “Configuring an IBM Server Running the AIX Operating Environment” on page I-1.
- “Configuring an HP Server Running the HP-UX Operating Environment” on page J-1.
- “Configuring a Windows NT Server” on page K-1

5.5.13 Saving Configuration (NVRAM) to a Disk

You can select to back up your controller-dependent configuration information. We recommend using this function to save configuration information whenever a configuration change is made.

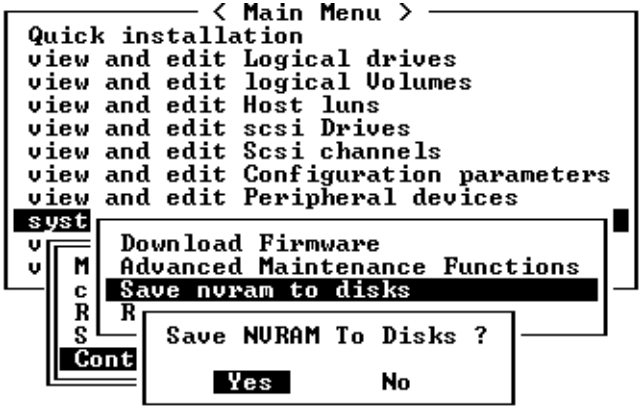
The logical configuration information is stored within the logical drive.

Note – A logical drive must exist for the controller to write NVRAM content onto it.

---

1. **From the Main Menu, select “system Functions.”**

   Use arrow keys to scroll down and select “controller maintenance,” select “save NVRAM to disks,” and then press Return.



2. **Select Yes to confirm.**

   A prompt confirms that the NVRAM information has been successfully saved.

   To restore the configuration, refer to “Restoring Your Configuration (NVRAM) From a File” on page 7-17.

5.6 Installing Software

The following software tools are available on the Sun StorEdge 3000 Family Professional Storage Manager CD, provided with your array:

- Sun StorEdge Configuration Service, a management and monitoring program
- Sun StorEdge Diagnostic Reporter software, a monitoring utility
- `sscli`(1M), a command line utility to download firmware and display the event log

The Sun StorEdge 3000 Family Documentation CD provides the related user guides with detailed installation and configuration procedures for these tools.

5.6.1 Other Supported Software

For other supported software, see the release notes for your array.

5.6.2 Enabling VERITAS DMP

To enable VERITAS Dynamic Multi-Pathing (DMP) support on VERITAS Volume Manager Version 3.2, perform the following steps.

1. **Configure at least two SCSI channels as host channels (channels 1 and 3 by default) and add additional SCSI host IDs if needed.**
2. **Connect host cables to the I/O host ports in step 1.**
3. **Map each LUN to two host channels to provide dual-pathed LUNs.**

4. **Add the correct SCSI string to** `vxddladm` **so VxVM can manage the LUNs as a multi-pathed JBOD.**

```
# vxddladm addjbod vid=SUN pid="StorEdge 3310"
# vxddladm listjbod
VID       PID     Opcode   Page     Code   Page Offset SNO length
==============================================================
SEAGATE  ALL      PIDs      18   -1       36         12
SUN      StorEdge  3310       18     -1       36          12
```

5. **Reboot the hosts. System reboot is required to implement these changes.**

CHAPTER 6

Checking LEDs

This chapter describes the front- and rear-panel LEDs, which give the clear status of the operation of all drives and modules. Topics covered in this chapter are:

- "LEDs When Array Is First Powered On" on page 6-1
- "Front-Panel LEDs" on page 6-3
- "Rear-Panel LEDs" on page 6-5

6.1 LEDs When Array Is First Powered On

With the array powered up without the SCSI bus configuration cable installed while the array is not connected to a server, you should see the LED conditions described in TABLE 6-1 and TABLE 6-2.

TABLE 6-1 Front-Panel LED Status When Array Is First Powered On

Drive LEDs	Solid green
Chassis ear LEDs	Solid green

TABLE 6-2 Rear-Panel LED Status When Array Is First Powered On

I/O Module:	
ERROR LED	Blinking green (no bus configuration; invalid state)
TERM LED	Solid green (autotermination enabled)
SNGL LED	Inactive (no bus configuration; invalid state)
Controller Module:	
ACTIVITY LED	(Inactive (controller not busy)
Center LED (status symbol)	Slow blinking green: good primary controller Solid green: good secondary controller
Right LED (battery symbol)	Blinking green if battery is charging Solid green if battery is fully charged
Ethernet port LEDs	Inactive
Power/fan module LEDs	Solid green
Event module LEDs	Solid green

6.2 Front-Panel LEDs

The drive LEDs are located between the rows of drives on the front panel (see following figure). The system operation LEDs are located on the right ear of the chassis.

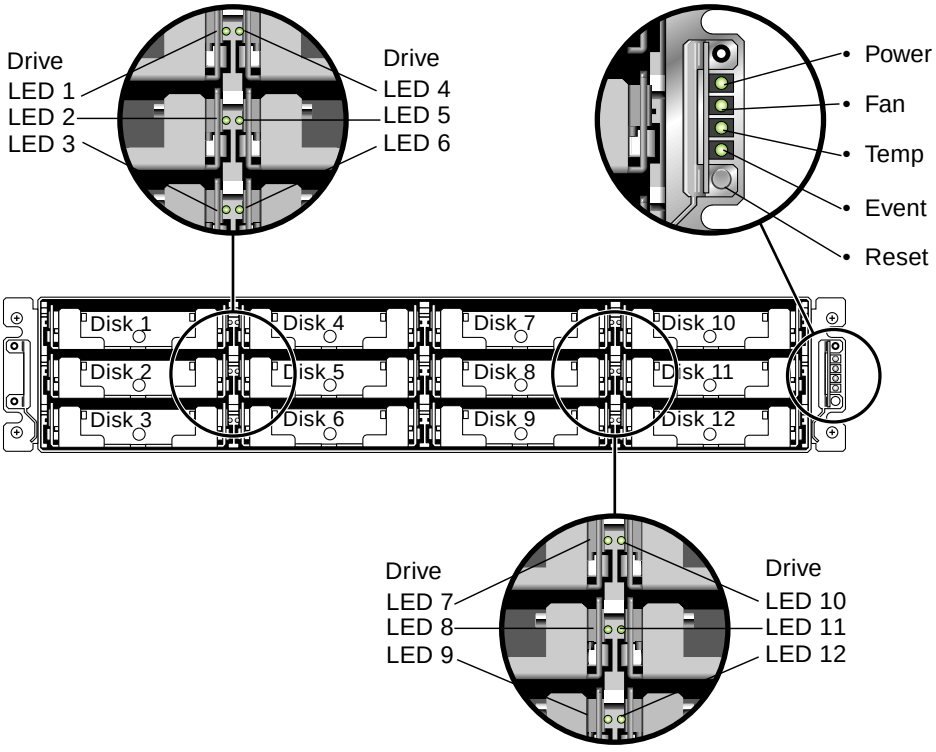


FIGURE 6-1 Front Panel LEDs

The following figure shows the front panel LEDs and reset pushbutton.

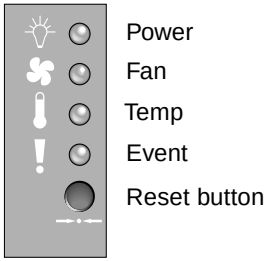


FIGURE 6-2 Chassis Ear LEDs and Reset Button on Front Panel

The following table lists the front-panel LEDs.

TABLE 6-3 Front Panel LEDs

LED	LED Color	Description
Drive	Solid green	Good: Drive power-up and spin-up OK.
	Blinking green	Good: Drive activity.
	Solid yellow	Failed: Drive failure.
Power (Light bulb icon) Monitors the DC output voltage within tolerance specification. Overcurrent protection shutting down any voltage output displayed. Voltage thresholds: +5 VDC +/–.25 VDC +12 VDC +/–.6 VDC Current thresholds: +5 VDC 35A +12 VDC 25A	Solid green Solid yellow	Power supply good. Failed: One or more output voltages out of range.

TABLE 6-3 Front Panel LEDs *(Continued)*

LED	LED Color	Description
Fan (Fan icon) Monitors the fan speed within nominal operational RPM specification of 5000 RPM.	Solid green Solid yellow	Good: Over 3150 RPM. Faulty: Failed: Under 3150 RPM.
Temp (Thermometer icon) Monitors the temperature level and indicates violations of internal temperature thresholds of 55C and 60C.	Solid green Solid yellow Blinking yellow	Good: Under temperature threshold of 55C. Failed: Temperature threshold equal to or over 55C. Failed: Temperature threshold equal to or over 60C. Blinking frequency of 4 Hz +/– 1 Hz.
Event (Caution icon) Indicates any abnormal or failure event in the RAID controller or EMU.	Solid green Solid yellow Blinking Yellow	Normal operation of RAID controller and EMUs. Abnormal event EMU. Abnormal event in RAID controller or failed RAID controller. Blinking frequency of 4 Hz +/– 1 Hz.

6.3 Rear-Panel LEDs

The rear-panel LED colors indicate the conditions described in the following figures and tables. The following figure is the rear-panel with LEDs.

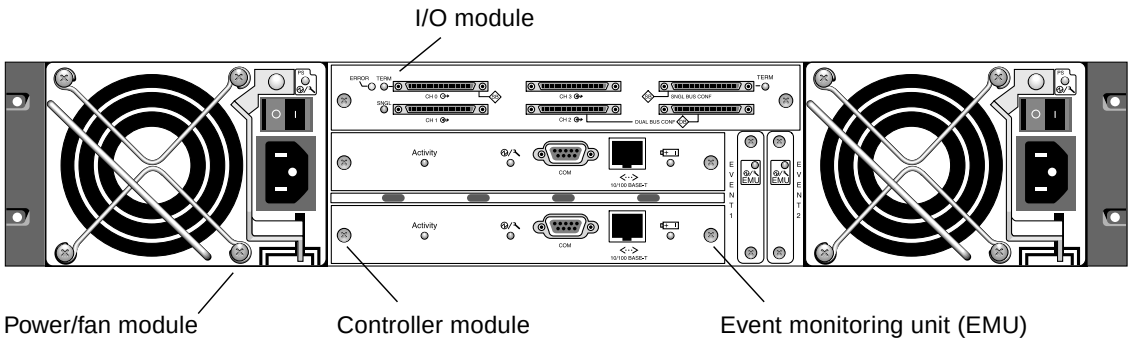


FIGURE 6-3 Rear-Panel LEDs

If you see a blinking green or yellow LED, you might have an incorrect configuration or a failed component.

6.3.1 RAID Controller LEDs

The following figure shows the RAID controller LEDs on the rear panel.

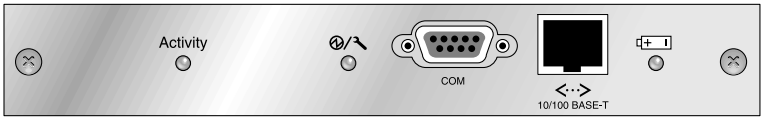


FIGURE 6-4 RAID Controller LEDs

The following table lists the RAID Controller LEDs.

TABLE 6-4 RAID Controller LEDs

LED	Color	Status
Activity LED	LED inactive	Not active.
	Blinking green	Controller is busy.
	Solid green	Controller data is in cache.
	Solid yellow	Power is lost and data is in memory.
Center LED (status symbol)	Slow-blinking green	Good: primary controller.
	Solid green	Good: secondary controller.
	Solid yellow	Failed controller.
Right LED (battery symbol)	Blinking green	Battery is charging.
	Solid green	Battery is fully charged.
	Solid yellow	Battery failed.
Ethernet 10/100 BASE-T LEDs (left and right corners of the connector)	Amber	Ethernet link is connected and working.
	Blinking green	Ethernet link is transmitting or receiving data.

6.3.2 Other Rear-Panel LEDs

The following table lists the other rear-panel module LEDs.

TABLE 6-5 Other Rear-Panel Module LEDs

Module	LED Color	Status
Power supply/fan		
Monitors the DC output voltage within tolerance specification.	Solid green	Power supply good.
	Solid yellow	Failed: one or more output voltages out of range.
Overcurrent protection shutting down any voltage output is also displayed.	Solid green	Good fan: Over 3150 RPM.
	Solid yellow	Faulty/failed: Under 3150 RPM.
Voltage thresholds: +5 VDC +/–.25 VDC +12 VDC +/–.6 VDC Current Thresholds: +5 VDC 35A +12 VDC 25A		
EMU module	Solid green	Good EMU module.
	Solid yellow	Failed EMU module.
I/O module		
TERM LEDs	Solid green	Autotermination enabled.
	Inactive LED	Autotermination disabled.
ERROR LED	Blinking green	Invalid single- or dual-cable configuration.
	Solid yellow	Failed I/O module.
	Inactive LED	Valid single- or dual-bus configuration, and I/O module is good.
SNGL LED	Solid green	Cabled for single-bus configuration or no configuration.
	Inactive LED	Cabled for dual-bus configuration.

The AC and DC power supply and fan modules have a single LED.

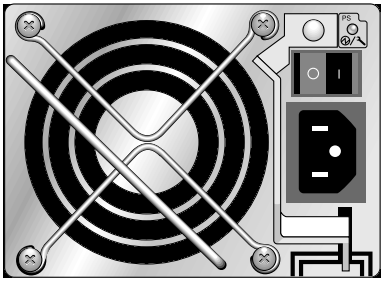


FIGURE 6-5 AC Power Supply and Fan Module

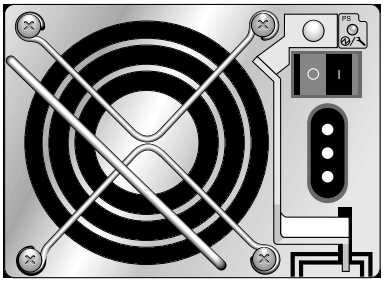


FIGURE 6-6 DC Power Supply and Fan Module

The I/O modules for a RAID array and for the expansion units have TERM, ERROR, and SNGL LEDs.

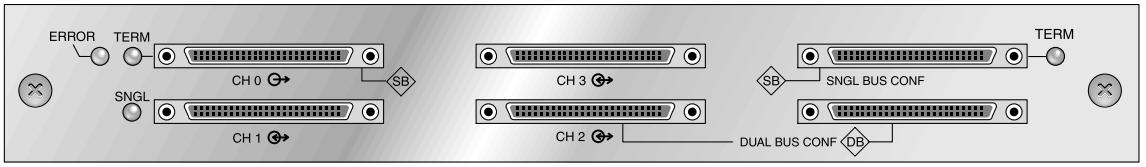


FIGURE 6-7 I/O Module for a RAID Array

The following figure illustrates the I/O Module for the Expansion Unit.

FIGURE 6-8 I/O Module for an Expansion Unit

The EMU module has a single LED.

FIGURE 6-9 EMU Module

CHAPTER 7

Maintaining Your Array

This chapter covers the following maintenance and troubleshooting topics:

- "Understanding Beep Codes" on page 7-1
- "Key Screens and Commands" on page 7-3
  - "The Controller Firmware Initial Screen" on page 7-3
  - "Main Menu" on page 7-4
  - "Quick Installation (Reserved)" on page 7-5
- "Checking Status Windows" on page 7-5
  - "Logical Drive Status Table" on page 7-5
  - "Logical Volume Status Table" on page 7-7
  - "SCSI Drive Status Table" on page 7-8
  - "SCSI Channel Status Table" on page 7-10
  - "Controller Voltage Temperature Status" on page 7-12
  - "Viewing SAF-TE Status" on page 7-13
  - "Viewing Event Logs on the Screen" on page 7-15
- "Restoring Your Configuration (NVRAM) From a File" on page 7-17
- "Upgrading Firmware" on page 7-18
  - "Patch Downloads" on page 7-18
  - "Controller Firmware Upgrade Features" on page 7-19
  - "Installing Firmware Upgrades" on page 7-19
  - "Installing Controller Firmware Upgrades from the Firmware Application" on page 7-20

7.1 Understanding Beep Codes

Beep codes send an audible warning for a failed component in an array. These audible tones use Morse code dot and dash characters. The dot "**.**" is a short tone sounding for one unit of time. The dash "**-**" is a long tone sounding for three units of time.

To silence an audible alarm, use a paperclip to push the Reset pushbutton on the right ear of the array.

TABLE 7-1 Beep Codes

Failure	Morse Code Letter	Morse Code Sound Pattern
Critical failure; shut down controller.	8 dashes	– – – – – – – –
Power supply 0 failure	P0	. – – . – – – – –
Power supply 1 failure	P1	. – – . . – – – –
Event alarm	E	.
Fan failure	F	. . – .
Voltage failure	V	. . . –
Temperature failure	T	–

The Critical failure beep tone indicates that equipment vital to the continued operation of the box has failed. Check alarms, error messages or logs for the cause if it is not apparent, and then shut down the controller. A Critical failure would occur, for example, if the temperature of the array heats up to over 55 degrees.

If you hear a Critical failure tone and do not shut down the controller promptly, serious damage may result to your array.

Note – You can silence the array's beeper permanently through the firmware application by selecting "system Functions," and then selecting "Mute beeper," and responding "yes" to the question.

7.2 Key Screens and Commands

This section introduces the initial and the main menu RAID controller firmware screens.

7.2.1 The Controller Firmware Initial Screen

You see the following initial controller screen when you first access the RAID controller firmware (via the controller COM port or Ethernet port).

To complete the connection to your management console, select the VT100 terminal mode or the appropriate mode for your communications software, and press Return.

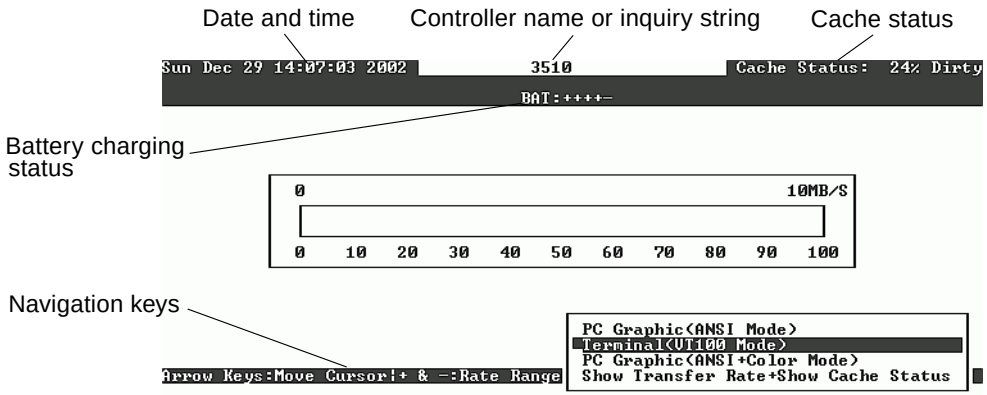


TABLE 7-2 Components of the Controller Firmware Window

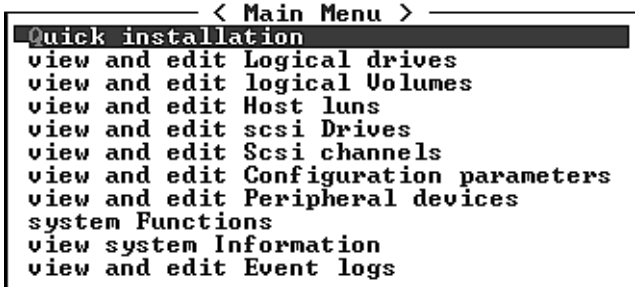
Component	Description
Cursor bar	Move the cursor bar to a desired item, and then press Return to select.
Controller name	Identifies the type of controller.
Transfer rate indicator	Indicates the current data transfer rate.
Gauge range	Use + or – keys to change the gauge range in order to view the transfer rate indicator.
Cache status	Indicates the current cache status.
PC Graphic (ANSI mode)	Enters the Main Menu and operates in ANSI mode.

TABLE 7-2 Components of the Controller Firmware Window *(Continued)*

Component	Description
(VT-100 mode)	Enters the Main Menu and operates in VT-100 mode.
PC graphic (ANSI+color mode)	Enters the Main Menu and operates in ANSI color mode.
Show transfer rate+show cache status	Press Return on this item to show the cache status and transfer rate.

7.2.2 Main Menu

After you have selected the mode and pressed Return on the initial screen, the Main Menu is displayed.


< Main Menu >
Quick installation
view and edit Logical drives
view and edit logical Volumes
view and edit Host luns
view and edit scsi Drives
view and edit Scsi channels
view and edit Configuration parameters
view and edit Peripheral devices
system Functions
view system Information
view and edit Event logs

Use the arrow keys to move the cursor bar through the menu items, then press Return to choose a menu, or press the ESC (Escape) key to return to the previous menu / screen.

Note – Each menu option has one letter that is capitalized and highlighted. This letter represents a keyboard shortcut you can use to invoke that menu option. Using this keyboard shortcut achieves the same results as using the arrow keys to select the menu option and pressing the Return key.

7.2.3 Quick Installation (Reserved)

This menu option is not used in normal operation. It is reserved for special use in special situations, and only when directed by Technical Support.

Caution – Do not use this menu item unless directed by Technical Support. Using it results in the loss of your existing configuration and all data you have on the devices.

7.3 Checking Status Windows

The status windows used to monitor and manage the array are described in the following sections:

- "Logical Drive Status Table" on page 7-5
- "Logical Volume Status Table" on page 7-7
- "SCSI Drive Status Table" on page 7-8
- "SCSI Channel Status Table" on page 7-10
- "Controller Voltage Temperature Status" on page 7-12
- "Viewing SAF-TE Status" on page 7-13
- "Viewing Event Logs on the Screen" on page 7-15

7.3.1 Logical Drive Status Table

To check and configure logical drives, from the Main Menu select "view and edit Logical drives," and press Return.

The status of all logical drives is displayed.

Q	LG	ID	LV	RAID	Size(MB)	Status	0	#LN	#SB	#FL	NAME
v	P0	64312D6F	NA	RAID0	208482	GOOD	S	6	-	0	
v	S1	76605A49	NA	RAID0	208482	GOOD	S	6	-	0	
v	2			NONE							
v	3			NONE							

TABLE 7-3 shows definitions and values for logical drive parameters.

TABLE 7-3 Parameters Displayed in the Logical Drive Status Window

Parameter		Description
LG		Logical drive number **P0**: Logical drive 0 of the primary controller where P = primary controller and 0 = logical drive number **S1**: Logical drive 1 of the secondary controller where s = secondary controller and 1 = logical drive number
	ID	Logical drive ID number (controller-generated).
LV		The logical volume to which this logical drive belongs. NA indicated no logical volume.
RAID		RAID level
SIZE (MB)		Capacity of the logical drive in megabytes.
Status		Logical drive status.
	INITING	The logical drive is now initializing.
	INVALID	The logical drive was improperly created or modified. For example, the logical drive was created with "Optimization for Sequential I/O," but the current setting is "Optimization for Random I/O."
	GOOD	The logical drive is in good condition.
	DRV FAILED	A drive member failed in the logical drive.
	FATAL FAIL	More than one drive member in a logical drive has failed.
	REBUILDING	The logical drive is rebuilding.
	DRV ABSENT	One of the disk drives cannot be detected.
	INCOMPLETE	Two or more member disk drives in this logical drive have failed.
O		Indicates the performance optimization set when the logical drive was initialized. This cannot be changed after the logical drive is created. S Optimization for Sequential I/O R Optimization for Random I/O
#LN		Total number of drive members in this logical drive.

TABLE 7-3 Parameters Displayed in the Logical Drive Status Window *(Continued)*

Parameter	Description
#SB	Number of standby drives available for the logical drive. This includes local spare and global spare disk drives available for the logical drive.
#FL	Number of failed disk drive member(s) in the logical drive.
Name	Logical drive name (user configurable)

To handle failed, incomplete, or fatal fail status, see “Identifying a Failed Drive for Replacement” on page 8-8 and “Recovering From Fatal Drive Failure” on page 8-11.

7.3.2 Logical Volume Status Table

To check status and to configure logical volumes, from the Main Menu select “view and edit logical volumes,” and press Return. The screen displays the status of all logical volumes. A logical volume may contain up to eight logical drives.

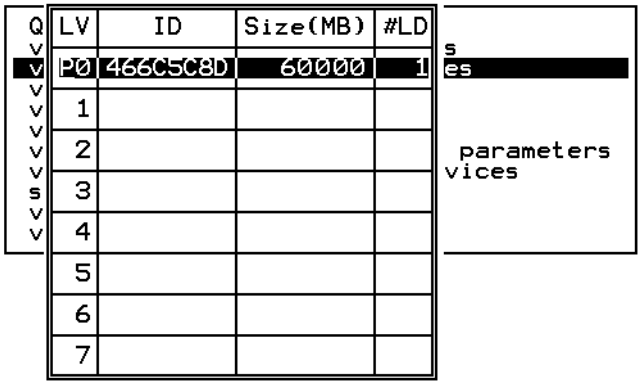


TABLE 7-4 Parameters Displayed in the Logical Volume Status Window

Parameters	Description
	Logical volume number where P = primary controller and S = secondary controller
ID	Logical volume ID number (controller-generated)
Size (MB)	Capacity of the logical volume in megabytes
#LD	The number of logical drive(s) in this logical volume

7.3.3 SCSI Drive Status Table

To check and configure physical SCSI drives, from the Main Menu select “view and edit scsi Drives,” and press Return.

The following screen displays the status of all SCSI drives.

If there is a drive installed but not listed, the drive may be defective or not installed correctly.

When power is on, the controller scans all hard drives that are connected through the drive channels. If a hard drive was connected after the controller completes initialization, use “Scan SCSI Drive” under the “view and edit scsi Drives” command to let the controller recognize the newly added hard drive and configure it as a member of a logical drive.

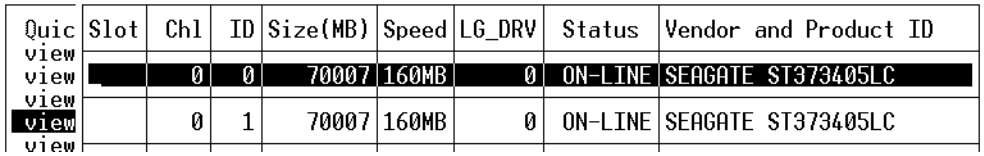

Quic Slot Chl ID Size(MB) Speed LG_DRV Status Vendor and Product ID
view
view 0 0 70007 160MB 0 ON-LINE SEAGATE ST373405LC
view
view 0 1 70007 160MB 0 ON-LINE SEAGATE ST373405LC
view

TABLE 7-5 Parameters Displayed in the Drive Status Window

Parameters	Description
Slot	Slot number of the SCSI drive
Chl	SCSI channel of the connected drive
ID	SCSI ID of the drive
Size (MB)	Drive capacity in megabytes
Speed	xxMB Maximum synchronous transfer rate of this drive. Async The drive is using asynchronous mode.
LG_DRV	x The SCSI drive is a drive member of logical drive *x*. If Status shows “STAND-BY,” the SCSI drive is a local spare drive of logical drive *x*.
Status	GLOBAL The SCSI drive is a global spare drive.
	INITING The drive is initializing.
	ON-LINE The drive is in good condition.
	REBUILD The drive is rebuilding.
	STAND-BY Local spare drive or global spare drive. The local spare drive’s LG_DRV column shows the logical drive number. The global spare drive LG_DRV column shows “Global.”

TABLE 7-5 Parameters Displayed in the Drive Status Window *(Continued)*

Parameters	Description	
	NEW DRV	The new drive has not been configured to any logical drive or as a spare drive.
	USED DRV	The drive was previously configured as part of a logical drive from which it has been removed; it still contains data from this logical drive.
	FRMT DRV	The drive has been formatted with reserved space allocated for controller-specific information.
	BAD	Failed drive.
	ABSENT	Drive slot is not occupied.
	MISSING	Drive once existed, but is now missing.
	SB-MISS	Spare drive missing.
Vendor and Product ID		Vendor and product model information of the drive.

A physical drive has a USED status when it was once a part of a logical drive but no longer is. This can happen, for instance, when a drive in a RAID 5 array is replaced by a spare drive and the logical drive is rebuilt with the new drive. If the removed drive is later replaced in the array and scanned, the drive status is identified as USED since the drive still has data on it from a logical drive.

When the RAID set is deleted properly, this information is erased and the drive status is shown as FRMT rather than USED. A drive with FRMT status has been formatted with either 64 KB or 256 MB of reserved space for storing controller-specific information, but has no user data on it.

If you remove the reserved space, using the View and Edit SCSI drives menu, the drive status changes to NEW.

To handle BAD drives, refer to “Identifying a Failed Drive for Replacement” on page 8-8.

If two drives show BAD and MISSING status, see “Recovering From Fatal Drive Failure” on page 8-11.

Note – If a drive is installed but not listed, the drive may be defective or installed incorrectly.

Note – When power is on, the controller scans all hard drives that are connected through the drive channels. If a hard drive was connected after the controller completes initialization, use the “Scan scsi drive” submenu option after you have selected a drive to let the controller recognize the newly added hard drive and configure it as a member of a logical drive.

7.3.4 SCSI Channel Status Table

To check and configure SCSI channels, from the Main Menu select “view and edit Scsi channels,” and press Return. The resulting screen displays the status of all SCSI channels for this controller.

Caution – Do not change the PID and SID values of drive channels.

< Main Menu >
Quick installation
view and edit Logical drives
view and edit logical Volumes
view and edit Host luns
view and edit scsi Drives
view and edit Scsi channels

Chl	Mode	PID	SID	DefSynClk	DefWid	S	Term	CurSynClk	CurWid
0	Drive	7	6	80.0MHz	Wide	L	On	80.0MHz	Wide
1	Host	0		80.0MHz	Wide	L	On	80.0MHz	Wide
2	Drive	7	6	80.0MHz	Wide	L	On	80.0MHz	Wide
3	Host	NA	2	80.0MHz	Wide	L	On	80.0MHz	Wide
6(D)	RCCOM								

A mapped host channel sometimes shows the current sync clock as "Async/Narrow" and correctly identify the change in speed. The host adapter driver is designed to downgrade the negotiation rate on certain errors (predominantly parity errors). There is little or no performance change.

TABLE 7-6 Parameters Displayed in the SCSI Channel Window

Parameters	Description	
Chl	SCSI channel's ID.	
Mode	Channel mode.	
	RCCom	Redundant controller communication channel
	Host	The channel is functioning as a host channel.
	Drive	The channel is functioning as a drive channel.
PID	Primary controller's SCSI ID mapping:	
	*	Multiple SCSI IDs were applied (host channel mode only).
	x	The SCSI ID for host LUNs mapped to this channel in Host Channel mode. SCSI ID for the primary controller in drive channel mode.
	NA	No SCSI ID applied.
SID	Secondary controller's SCSI ID mapping:	
	*	Multiple SCSI IDs (Host Channel mode only).
	x	The SCSI ID for host LUNs mapped to this channel in host channel mode. SCSI ID for the secondary controller in drive channel mode.
	NA	No SCSI ID applied
DefSynClk	Default SCSI bus synchronous clock:	
	xx.xMHz	Maximum synchronous transfer rate set to xx.x.
	Async	Channel is set for asynchronous transfers.
DefWid	Default SCSI bus width:	
	Wide	Channel is set to allow wide (16-bit) transfers.
	Narrow	Channel is set to allow narrow (8-bit) transfers.
S	Signal:	
	S	Single-ended
	L	LVD
	F	Fibre
Term	Terminator status:	

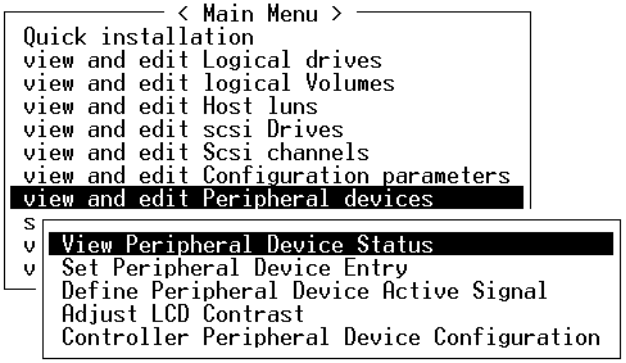
TABLE 7-6 Parameters Displayed in the SCSI Channel Window *(Continued)*

Parameters	Description	
	On	Termination is enabled.
	Off	Termination is disabled.
	NA	For a redundant controller communications channel (RCCOM).
CurSynClk	Current SCSI bus synchronous clock:	
	xx.xMHz	The current speed at which the channel is communicating.
	Async.	The channel is communicating asynchronously or not device is detected.
	(empty)	The default SCSI bus synchronous clock has changed. Reset the controller for changes to take effect.
CurWid	Current SCSI bus width:	
	Wide	The channel is currently servicing wide 16-bit transfers.
	Narrow	The channel is currently servicing narrow 8-bit transfers.
	(empty)	The default SCSI bus width has changed. Reset the controller for the changes to take effect.

7.3.5 Controller Voltage Temperature Status

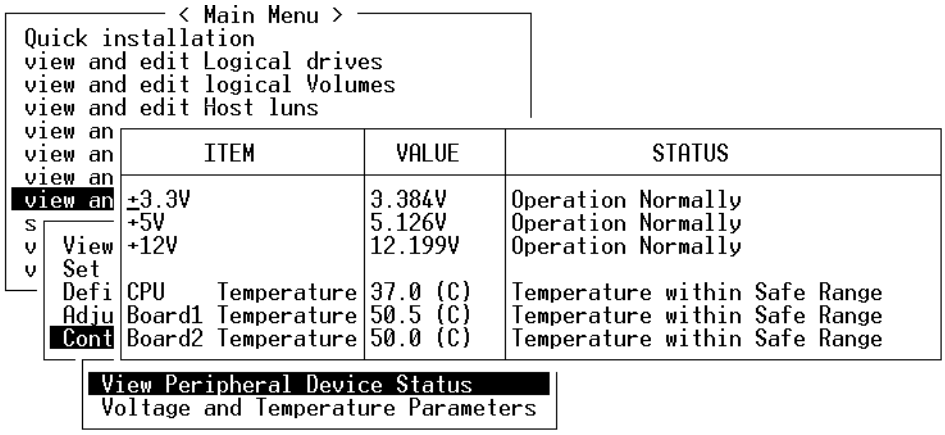
To check the status of controller voltage and temperature, perform the following steps.

1. **From the Main Menu select “view and edit Peripheral devices,” and press Return.**


< Main Menu >
Quick installation
view and edit Logical drives
view and edit logical Volumes
view and edit Host luns
view and edit scsi Drives
view and edit Scsi channels
view and edit Configuration parameters
view and edit Peripheral devices
View Peripheral Device Status
Set Peripheral Device Entry
Define Peripheral Device Active Signal
Adjust LCD Contrast
Controller Peripheral Device Configuration

2. **Select “Controller Peripheral Device Configuration,” and press Return.**

3. **Select “View Peripheral Device Status” and press Return to view voltage and temperature status of the RAID unit.**



The components checked for voltage and temperature are displayed on the screen and are defined as normal or out-of-order.

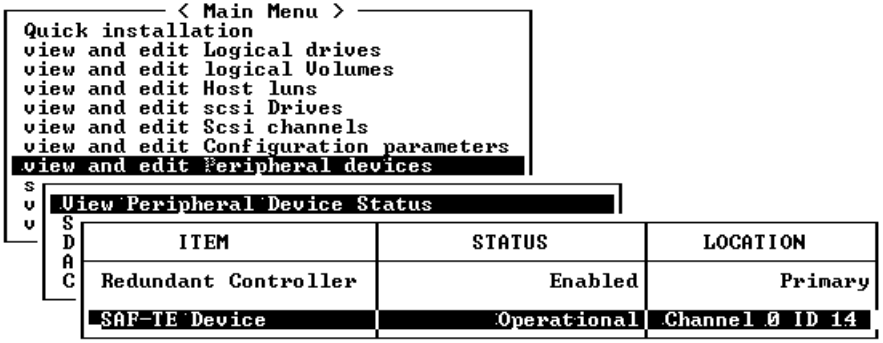
4. **Select “Voltage and Temperature Parameters” and press Return to view or edit the trigger thresholds that determine voltage and temperature status.**

7.3.6 Viewing SAF-TE Status

The SAF-TE controller is located on the SCSI I/O module.

To check the status of SAF-TE components (temperature sensors, cooling fans, the beeper speaker, power supplies, and slot status), perform the following steps.

1. **From the Main Menu select “view and edit Peripheral devices,” and press Return.**
2. **Select “View Peripheral Device Status,” and press Return.**



3. **Select "SAF-TE Device," and press Return to view the status of temperature sensors, power supplies, beeper speaker, and cooling fans.**

   The temperature sensor displays the current temperature of each sensor in degrees Fahrenheit.

   The drive slot status indicates that a slot is filled by displaying a SCSI ID number:

   - Single bus configuration: 0 through 13 ID numbers if all 12 drives are filled. SCSI IDs 6 and 7 are reserved for host communication. If there is an empty slot, the message "No Device Inserted" is displayed. See FIGURE 7-1.
   - Dual-bus configuration (not supported): the message "No Device Inserted" for the six drives on one channel and six ID numbers for the second channel. See FIGURE 7-2.

Product ID	StorEdge 2310 A	Drive Slot 1	SCSI ID 1
Revision Level	0.62	Drive Slot 2	SCSI ID 2
Unique ID	3030303132323338	Drive Slot 3	SCSI ID 3
		Drive Slot 4	SCSI ID 4
Cooling Fan 0	Operational	Drive Slot 5	SCSI ID 5
Cooling Fan 1	Operational	Drive Slot 6	SCSI ID 8
Power Supply 0	Operational and On	Drive Slot 7	SCSI ID 9
Power Supply 1	Operational and On	Drive Slot 8	SCSI ID 10
Temp Sensor 0	78	Drive Slot 9	SCSI ID 11
Temp Sensor 1	78	Drive Slot 10	SCSI ID 12
Temp Sensor 2	80	Drive Slot 11	SCSI ID 13
Temp Sensor 3	86		
Temp Sensor 4	91		
Temp Sensor 5	82		
Temp Sensor 6	82		
Temp Alert	Normal		
Speaker Status	Off or No Speaker		
Drive Slot 0	SCSI ID 0		

FIGURE 7-1 Example of SAF-TE Device Status Window in a Single-Bus Configuration

In the following dual-bus configuration example, the SAF-TE window displays “No Device Inserted” for six drives which are actually inserted into slots. The SAF-TE protocol does not support a dual-bus configuration and only recognizes one bus (half the drives) if you have a dual-bus configuration.

Product ID	StorEdge 3310 A	Drive Slot 1	No Device Inserted
Revision Level	A000	Drive Slot 2	No Device Inserted
Unique ID	3132333435362020	Drive Slot 3	No Device Inserted
		Drive Slot 4	No Device Inserted
Cooling Fan 0	Operational	Drive Slot 5	No Device Inserted
Cooling Fan 1	Operational	Drive Slot 6	SCSI ID 0
Power Supply 0	Operational and On	Drive Slot 7	SCSI ID 1
Power Supply 1	Operational and On	Drive Slot 8	SCSI ID 2
Temp Sensor 0	89	Drive Slot 9	SCSI ID 3
Temp Sensor 1	86	Drive Slot 10	SCSI ID 4
Temp Sensor 2	82	Drive Slot 11	SCSI ID 5
Temp Sensor 3	77		
Temp Sensor 4	82		
Temp Sensor 5	84		
Temp Sensor 6	82		
Temp Alert	Normal		
Speaker Status	Off or No Speaker		
Drive Slot 0	No Device Inserted		

FIGURE 7-2 Example of SAF-TE Device Status Window in a Dual-Bus Configuration

4. **To check that you have all slots filled in a dual-bus configuration, see “SCSI Drive Status Table” on page 7-8 and check the column labeled “Chl ID.”**

7.3.7 Viewing Event Logs on the Screen

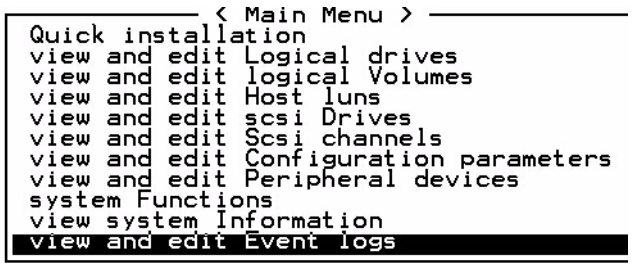
A controller event log records an event or alarm which occurs after the system is powered on.

Note – The Event Monitoring Units in each RAID unit and each Expansion Unit send messages to the controller log which report problems and status of the fans, temperature, and voltage.

Caution – Powering off or resetting the controller automatically deletes all recorded event logs.

---

1. **To view the event logs on screen, select “view and edit Event logs” on the Main Menu and press Return.**


< Main Menu >
Quick installation
view and edit Logical drives
view and edit logical Volumes
view and edit Host luns
view and edit scsi Drives
view and edit Scsi channels
view and edit Configuration parameters
view and edit Peripheral devices
system Functions
view system Information
view and edit Event logs

A log of recent events is displayed.

TABLE 7-7 Example Event Logs

[0181] Controller Initialization Completed
[2181] LG:0 Logical Drive NOTICE: Starting Initialization
[2182] Initialization of Logical Drive 0 Completed
[2181] LG:1 Logical Drive NOTICE: Starting Initialization
[2182] Initialization of Logical Drive 2 Completed

Note – The controller can store up to 1000 event logs. An event log can record a configuration or operation event as well as an error message or alarm event

2. **Use your arrow keys to move up and down through the list.**
3. **To clear the events from the log once you’ve read them, use your arrow keys to move down to the last event you want to clear and press Return.**

   A “Clear Above xx Event Logs?” confirmation message is displayed.

4. **Select Yes to clear the recorded event logs.**

Note – Resetting the controller clears the recorded event logs. To retain event logs after controller resets, you can install and use the Sun StorEdge Configuration Service program.

7.4 Restoring Your Configuration (NVRAM) From a File

If you have saved a configuration file and want to apply the same configuration to another array or reapply it to the array that had the configuration originally, you must be certain that the channels and SCSI IDs in the configuration file are correct for the array where you are restoring the configuration.

The NVRAM configuration file restores all configuration settings (channel settings, and host IDs) but does not rebuild logical drives.

To save a configuration file, see “Saving Configuration (NVRAM) to a Disk” on page 5-30.

Caution – If the channels or SCIS IDs are not a correct match for the array, you lose access to the mismatched channels or drives when you restore the configuration with the configuration file.

Note – In the Sun StorEdge Configuration Service program, you can save a configuration file that can restore all configurations and rebuild all logical drives. However, it also erases all data when it rebuilds all logical drives, so operation is performed only when no data has been stored or all data has been transferred to another array.

To restore configuration settings from a saved NVRAM file, perform the following steps.

1. **From the Main Menu choose “system Functions.”**
2. **Select “Controller maintenance” and press Return.**
3. **Select “Restore NVRAM from disks” and press Return.**
4. **Press Yes to confirm.**

   A prompt notifies you that the controller NVRAM data has been successfully restored from disks.

7.5 Upgrading Firmware

From time to time, firmware upgrades are made available as patches that you can download from SunSolve™ Online, located at `http://sunsolve.sun.com`. Each patch applies to a particular piece of firmware, including:

- Controller firmware
- Drive firmware
- SES firmware (Fibre Channel only)
- PLD firmware (Fibre Channel only)
- SAF-TE firmware (SCSI only)

SunSolve has extensive search capabilities that can help you find these patches, as well as regular patch reports and alerts to let you know when firmware upgrades and other patches become available. In addition, SunSolve provides reports about bugs that have been fixed in patch updates.

Each patch includes an associated Readme text file that provides detailed instructions about how to download and install that patch. But, generally speaking, all firmware downloads follow the same steps:

- Locating the patch on SunSolve that contains the firmware upgrade you want.
- Downloading the patch to a location on your network.
- Using your array software (SSCS or `sscli`(1M) or array firmware, in the case of controller firmware, to “flash” the firmware to the device it updates.

7.5.1 Patch Downloads

1. **Once you have determined that a patch is available to update firmware on your array, make note of the patch number or use SunSolve Online’s search capabilities to locate and navigate to the patch.**
2. **Read the Readme text file associated with that patch for detailed instructions on downloading and installing the firmware upgrade.**
3. **Follow those instructions to download and install the patch.**

7.5.2 Controller Firmware Upgrade Features

The following firmware upgrade features apply to the controller firmware:

- Redundant Controller Rolling Firmware Upgrade

  When download is performed on a dual-controller system, firmware is flashed onto both controllers without interrupting host I/O. When the download process is complete, the primary controller resets and lets the secondary controller take over the service temporarily. When the primary controller comes back on-line, the secondary controller hands over the workload and then resets itself so the new firmware can take effect. This rolling upgrade is automatically performed by controller firmware, and the user's intervention is not necessary.

- Automatically Synchronized Controller Firmware Versions

  A controller that replaces a failed unit in a dual-controller system is often running a newer release of firmware version. To maintain compatibility, the surviving primary controller automatically updates the firmware running on the replacement secondary controller to the firmware version of the primary controller.

Note – When you upgrade your firmware, the `format`(1M) command still shows the earlier revision level. To correct this you need to update the drive label, using the `autoconfigure` option (option 0) of the `format`(1M) command. When you select `label`, the drive is labelled with the updated firmware version.

- Upgrading Firmware Using the Serial Port Connections (from Windows hosts)

  The firmware can be downloaded to the RAID controller by using an ANSI/VT-100 compatible emulation program. The emulation program must support the ZMODEM file transfer protocol. Emulation programs such as HyperTerminal, Telix, and PROCOMM Plus can perform the firmware upgrade.

7.5.3 Installing Firmware Upgrades

It is important that you run a version of firmware that is supported for your array.

Caution – Before updating your firmware, make sure that the version of firmware you want to use is supported for your array. Refer to the Release Notes for your array for Sun Microsystems patches containing firmware upgrades that are available for your array, and to SunSolve Online for subsequent patches containing firmware upgrades.

If you are downloading a Sun Microsystems patch that includes a firmware upgrade, the Readme file associated with that patch tells you which Sun StorEdge 3000 Family arrays support this firmware release.

To download new versions of controller firmware, disk drive firmware, SAF-TE firmware, use one of the following tools:

- Sun StorEdge CLI (with an in-band SCSI connection, for Linux and Windows hosts, and for servers running the Solaris operating environment)
- Sun StorEdge Configuration Service program (with an in-band SCSI connection, for Linux and Windows hosts and servers running the Solaris operating environment)
- Firmware application (for controller firmware download only from a Windows host with an out-of-band serial port connection). Refer to "Installing Controller Firmware Upgrades from the Firmware Application" on page 7-20.

Note – To download firmware to disk drives or SAF-TE firmware to a JBOD directly attached to a host, you must use the Sun StorEdge Configuration Service program.

Note – For instructions on how to download firmware to disk drives in a JBOD directly attached to a host, refer to the Readme file in the patch that contains the firmware.

Caution – You should not use both in-band and out-of-band connections at the same time to manage the array or you might cause conflicts between multiple operations.

7.5.4 Installing Controller Firmware Upgrades from the Firmware Application

You can use a Windows terminal emulation session with ZMODEM capabilities to access the firmware application. To upgrade the RAID controller firmware through the serial port and the firmware application, perform the following steps.

1. **Establish the serial port connection.**
   - To upgrade both the boot record and the firmware binary, perform step 2.
   - To upgrade only the firmware binary, perform step 3.
2. **Upgrade both boot record and firmware binaries with the following steps.**

a. **From the Main Menu scroll down to “System Functions.”**

b. **Go to “Controller Maintenance” and select “Advanced Maintenance.”**

c. **Select “Download Boot Record and Firmware.”**

d. **Set ZMODEM as the file transfer protocol of your emulation software.**

e. **Send the Boot Record Binary to the controller**:

In HyperTerminal, go to the “Transfer” menu and choose “Send file.” If you are not using HyperTerminal, choose “Upload” or “Send” (depending on the software).

f. **After the Boot Record has been downloaded, send the Firmware binary to the controller**:

In HyperTerminal, go to the “Transfer” menu and choose “Send file.” If you are not using HyperTerminal, choose “Upload” or “Send” (depending on the software).

When the firmware update is complete, the controller automatically resets itself.

3. **Upgrade the firmware binary only with the following steps.**

a. **From the Main Menu scroll down to “System Functions.”**

b. **Go to “Controller Maintenance” and select “Advanced Maintenance.”**

c. **Choose “Download Firmware.”**

d. **Set ZMODEM as the file transfer protocol of your emulation software.**

e. **Send the firmware binary to the controller**:

In HyperTerminal, select “Send file.” If you are not using Hyper, choose “Upload” or “Send” (depending on the software).

When the firmware update is complete, the controller automatically resets itself.

CHAPTER 8

Troubleshooting Your Array

This chapter covers the following troubleshooting topics:

- "RAID LUNs Not Visible to the Host" on page 8-1
- "JBOD Disks Not Visible to the Host" on page 8-2
- "Controller Failover" on page 8-2
- "Rebuilding Logical Drives" on page 8-3
  - "Automatic Logical Drive Rebuild" on page 8-3
  - "Manual Rebuild" on page 8-6
  - "Concurrent Rebuild in RAID 1+0" on page 8-7
  - "Identifying a Failed Drive for Replacement" on page 8-8
  - "Flash Selected Drive" on page 8-9
  - "Flash All SCSI Drives" on page 8-10
  - "Flash All But Selected Drive" on page 8-10
  - "Recovering From Fatal Drive Failure" on page 8-11

To check front-panel and back-panel LEDs, see "Checking LEDs" on page 6-1.

For more troubleshooting tips, refer to the Sun StorEdge 3310 SCSI Release Notes at:

`www.sun.com/products-n-solutions/`
`hardware/docs/Network_Storage_Solutions/Workgroup/3310`

8.1 RAID LUNs Not Visible to the Host

By default, all RAID arrays are preconfigured with one or two logical drives. For a logical drive to be visible to the host server, its partitions must be mapped to host LUNs. (For mapping details, refer to "Mapping Logical Drive Partitions to Host LUNs" on page 5-27.) Check that you have completed this task.

To make the mapped LUNs visible to a specific host, perform the steps required for your operating system or environment, if there are any special requirements. For host-specific information about different operating environments and operating systems see:

- “Configuring a Server Running the Solaris Operating Environment” on page F-1
- “Configuring a Windows 2000 Server” on page G-1
- “Configuring a Linux Server” on page H-1
- “Configuring an IBM Server Running the AIX Operating Environment” on page I-1
- “Configuring an HP Server Running the HP-UX Operating Environment” on page J-1
- “Configuring a Windows NT Server” on page K-1

8.2 JBOD Disks Not Visible to the Host

If you attach a JBOD array directly to a host server and do not see the drives on the host server, check that the cabling is correct and that there is proper termination. Refer to the special cabling procedures in “Cabling JBODs” on page B-1.

For additional information about specific servers, see the operating system appendices in the previous section of this document.

8.3 Controller Failover

Controller failure symptoms are as follows:

- The surviving controller sounds an audible alarm.
- The center LED (status symbol) flashes yellow on the failed controller.
- The surviving controller sends event messages announcing the controller failure of the other controller.

A “SCSI Bus Reset Issued” alert message is displayed for each of the SCSI channels. A “Redundant Controller Failure Detected” alert message is also displayed. These messages are also written to the event log.

If one controller in the redundant controller configuration fails, the surviving controller temporarily takes over for the failed controller until it is replaced.

A failed controller is managed by the surviving controller which disables and disconnects from its counterpart while gaining access to all the signal paths. The surviving controller then manages the ensuing event notifications and takes over all processes. It is always the primary controller regardless of its original status, and any replacement controller afterward assumes the role of the secondary controller.

The failover and failback processes are completely transparent to the host.

Controllers are hot-swappable if you are using a redundant configuration, and replacing a failed unit takes only a few minutes. Since the I/O connections are on the controllers, you may experience some unavailability between the times when the failed controller is removed and a new one is installed in its place.

To maintain your redundant controller configuration, replace the failed controller as soon as possible. For details, refer to *Sun StorEdge 3000 Family FRU Installation Guide*.

8.4 Rebuilding Logical Drives

This section describes automatic and manual procedures for rebuilding logical drives.

8.4.1 Automatic Logical Drive Rebuild

Rebuild with Spare: When a member drive in a logical drive fails, the controller first examines whether there is a local spare drive assigned to this logical drive. If yes, it automatically starts to rebuild the data of the failed disk to it.

If there is no local spare available, the controller searches for a global spare. If there is a global spare, it automatically uses it to rebuild the logical drive.

Failed Drive Swap Detect: If neither a local spare drive nor a global spare drive is available, and the “Periodic Auto-Detect Failure Drive Swap Check Time” is “disabled,” the controller does not attempt to rebuild unless you apply a forced-manual rebuild.

To enable this feature, follow these steps:

1. **From the Main Menu choose “view and edit Configuration parameters” and press Return.**
2. **Select “Drive-side SCSI Parameters” and press Return.**
3. **Select “Periodic Auto-Detect Failure Drive Swap Check Time” and press Return.**

When the “Periodic Auto-Detect Failure Drive Swap Check Time” is “Enabled” (that is, a check time interval has been selected), the controller detects whether or not the failed drive has been swapped (by checking the failed drive's channel/ID). Once the failed drive has been swapped, the rebuild begins immediately.

Note – This feature requires system resources and can impact performance.

If the failed drive is not swapped but a local spare is added to the logical drive, the rebuild begins with the spare.

For a flowchart of automatic rebuild, see FIGURE 8-1.

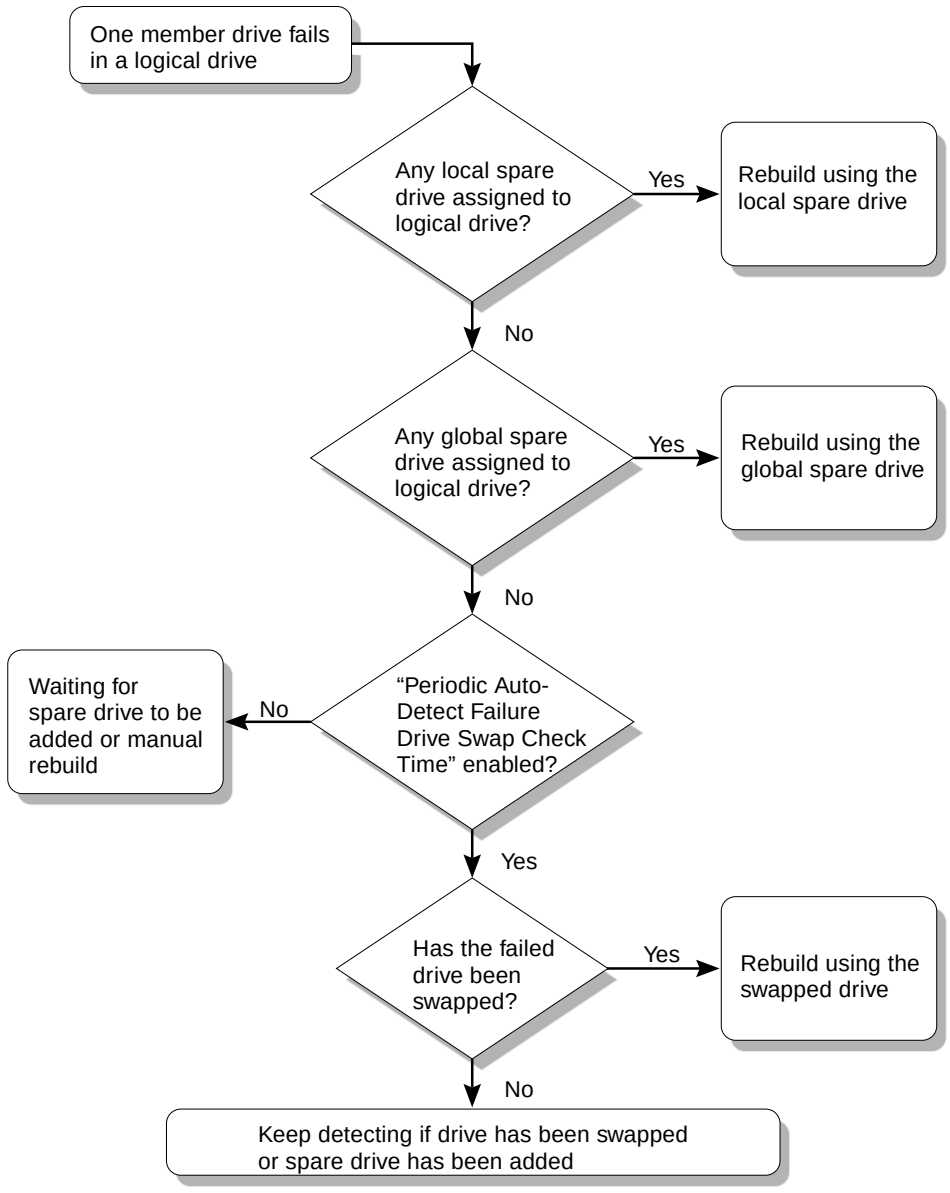

One member drive fails in a logical drive
Any local spare drive assigned to logical drive?
Yes
Rebuild using the local spare drive
No
Any global spare drive assigned to logical drive?
Yes
Rebuild using the global spare drive
No
“Periodic Auto-Detect Failure Drive Swap Check Time” enabled?
No
Waiting for spare drive to be added or manual rebuild
Yes
Has the failed drive been swapped?
Yes
Rebuild using the swapped drive
No
Keep detecting if drive has been swapped or spare drive has been added

FIGURE 8-1 Automatic Rebuild

8.4.2 Manual Rebuild

When a user applies forced-manual rebuild, the controller first examines whether there is any local spare assigned to the logical drive. If yes, it automatically starts to rebuild.

If there is no local spare available, the controller searches for a global spare. If there is a global spare, the logical drive rebuild begins. See FIGURE 8-2 for a flow-chart illustration of this process.

If neither local spare nor global spare is available, the controller examines the SCSI channel and ID of the failed drive. After the failed drive has been replaced by a healthy one, the logical drive rebuild begins on the new drive. If there is no drive available for rebuilding, the controller does not attempt to rebuild until the user applies another forced-manual rebuild.

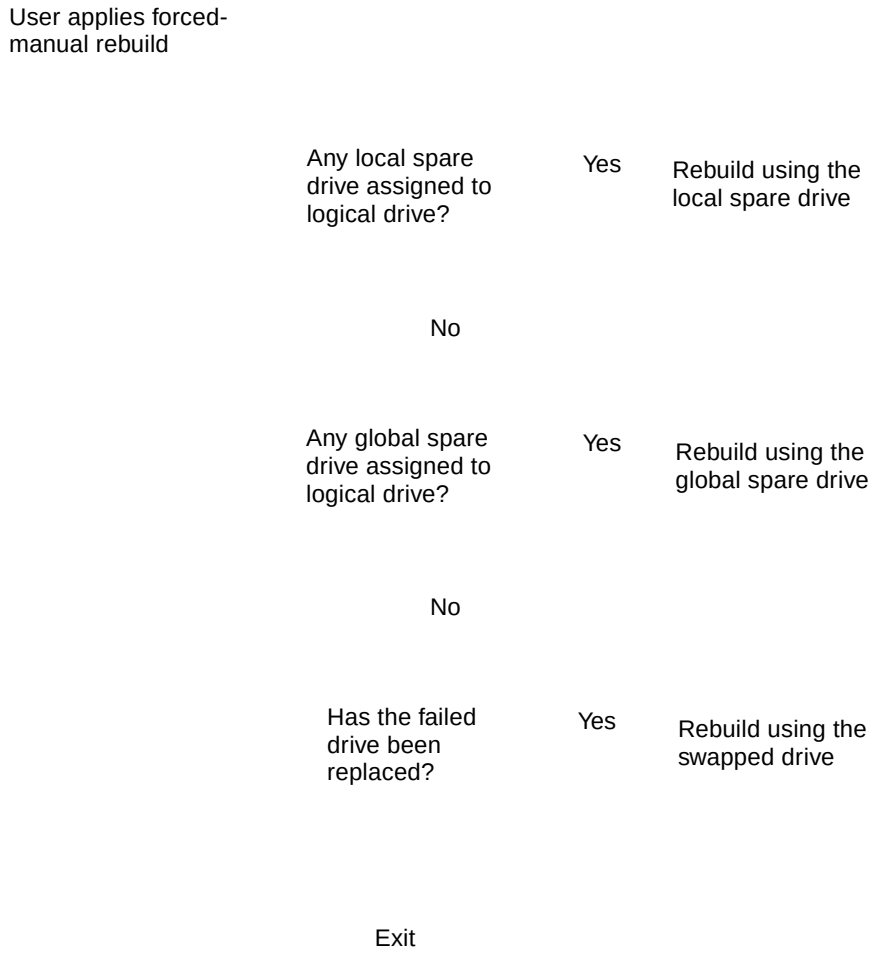


FIGURE 8-2 Manual Rebuild

8.4.3 Concurrent Rebuild in RAID 1+0

RAID 1+0 allows multiple-drive failure and concurrent multiple-drive rebuild. Drives newly swapped must be scanned and set as local spares. These drives are rebuilt at the same time; you do not need to repeat the rebuilding process for each drive.

8.4.4 Identifying a Failed Drive for Replacement

If there is a failed drive in the RAID 5 logical drive, replace the failed drive with a new drive to keep the logical drive working.

Caution – If, when trying to remove a failed drive, you mistakenly remove the wrong drive in the same logical drive, you can no longer access the logical drive because you have incorrectly failed a second drive and caused a critical failure of the RAID set.

Note – The following procedure only works if there is no I/O activity.

To find a failed drive, identify a single drive, or test all drive activity LEDs, perform the following steps.

1. **On the Main Menu, select "view and edit scsi Drives" and press Return.**
2. **Select the drive you want to identify and press Return.**
3. **Select the "Identifying scsi drive" function.**
4. **Select "flash All drives" to flash the activity LEDs of all of the drives in the drive channel and press Return.**

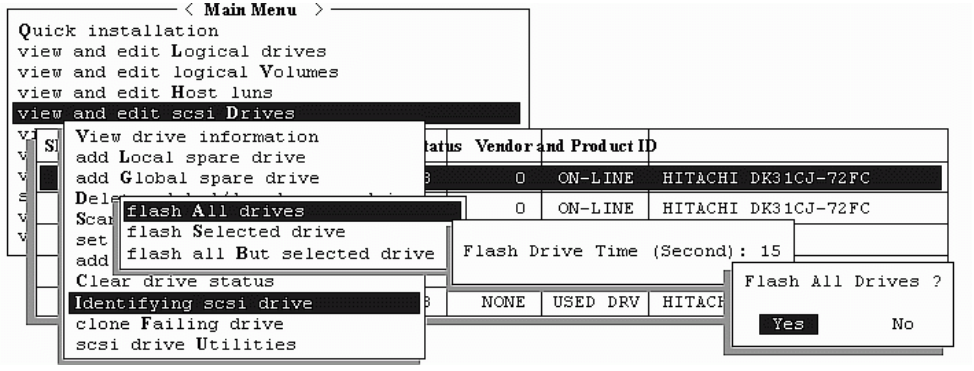


FIGURE 8-3 Identify Drive Option with Flashing LEDs on Drives

The option to change the Flash Drive Time is displayed.

The read/write LED of a failed hard drive does not light. Identifying the drive whose LED does not light helps you avoid removing the wrong drive.

5. **Confirm your choice by pressing Return and selecting “Yes.”**

Alternatively, to flash the read / write LED of only a selected drive, choose “flash Selected drive” or “flash all But selected drive” and perform the same procedure.

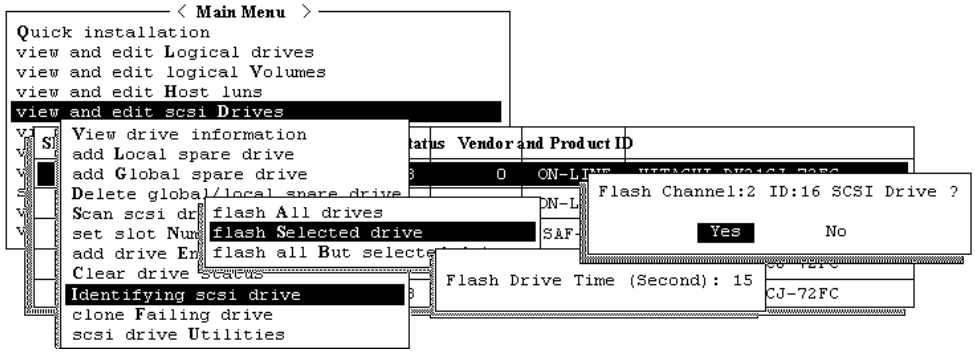


FIGURE 8-4 Selecting a Command to Flash All or Selected Drive LEDs

8.4.5 Flash Selected Drive

When you choose this menu option, the read / write LED of the drive you select lights steadily for a configurable period of time from 1 to 999 seconds.

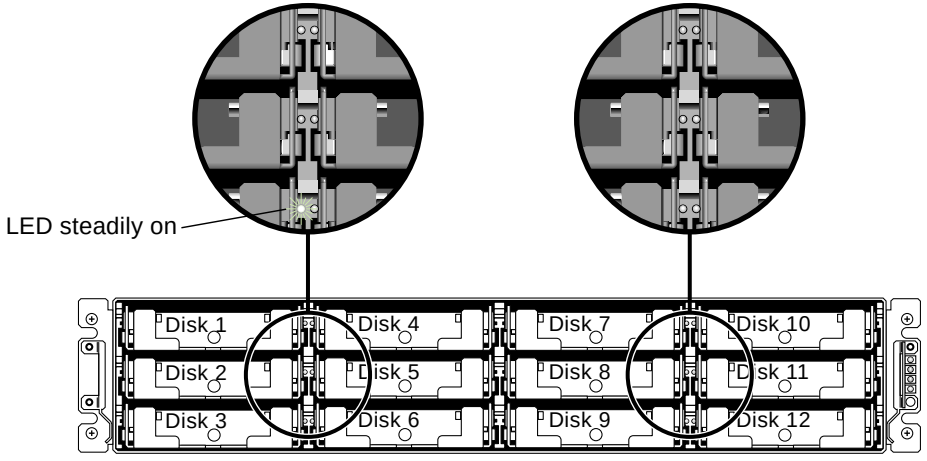


FIGURE 8-5 Flashing the Drive LED of a Selected Drive

8.4.6 Flash All SCSI Drives

The “Flash All SCSI Drives” menu option lights LEDs of all good drives but does not light LEDs for any defective drives. In the illustration, there are no defective drives.

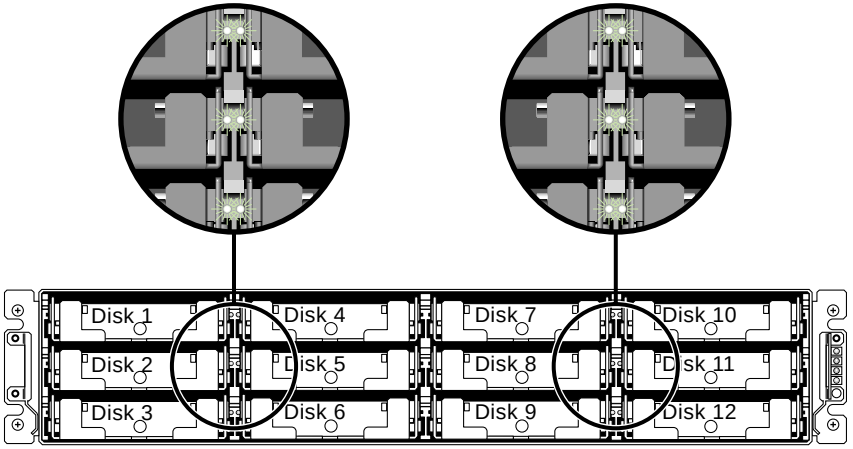


FIGURE 8-6 Flashing All Drive LEDs to Detect a Defective Non-Flashing Drive

8.4.7 Flash All But Selected Drive

With this menu option, the read / write LEDs of all connected drives except the selected drive lights for a configurable period of time from 1 to 999 seconds.

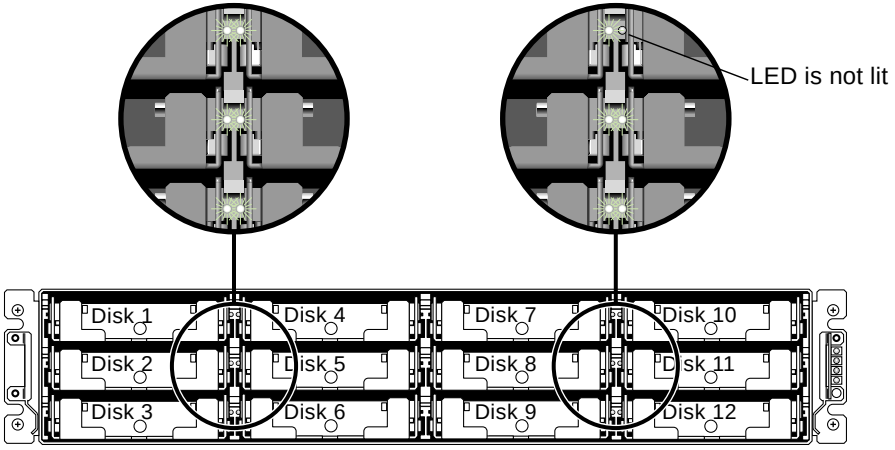


FIGURE 8-7 Flashing All Drive LEDs Except a Selected Drive LED

8.4.8 Recovering From Fatal Drive Failure

With the redundant RAID array system, your system is protected with the RAID parity drive and by a default global spare or spares.

Note – A FATAL FAIL status occurs when there is one more drive failing than the number of spare drives available for the logical drive. If a logical drive has two global spares available, then three failed drives must occur for FATAL FAIL status.

In an extremely rare occurrence where two or more drives appear to fail at the same time, perform the following steps.

1. **Discontinue all input/output activity immediately.**
2. **To cancel the beeping alarm, use a paperclip to press the Reset button (below the LEDs on the front-right ear of the array).**
3. **Physically check that all the drives are firmly seated in the array and that none have been partially or completely removed.**
4. **Check again the firmware Main Menu and check the "view and edit Logical drives," and look for:**

   Status: FAILED DRV (one failed drive) or
   Status: FATAL FAIL (two or more failed drives)

5. **Highlight the logical drive, press Return, and select "view scsi drives."**

   If two physical drives have a problem, one drive has a BAD status and one drive has a MISSING status. The MISSING status is a reminder that one of the drives may be a "false" failure. The status does not tell you which drive might be a false failure.

6. **Do one of the following:**

   - Choose "system Functions" from the Main Menu and press Return. Select "Reset controller," and press Return.

   or

   - Power off the array. Wait five seconds, and power on the array.

7. **Repeat steps 4 and 5 to check the logical and SCSI drive status.**

   After resetting the controller, if there is a false bad drive, the array automatically starts rebuilding the failed RAID set.

   If the array does not automatically start rebuilding the RAID set, check the status under "view and edit Logical drives."

   - If the status is "FAILED DRV," manually rebuild the RAID set (refer to "Manual Rebuild" on page 8-6).

- If the status is still “FATAL FAIL,” you have lost all data on the logical drive and must re-create the logical drive. Proceed with the following procedures:
  - “Replacing a Drive” (*Sun StorEdge 3000 Family FRU Installation Guide)*
  - “Deleting a Logical Drive” (Section 3.7 in the *Sun StorEdge 3000 Family RAID Firmware 3.25 User’s Guide)*
  - “Creating Logical Drive(s) (optional)” on page 5-15

For additional troubleshooting tips, refer to the *Sun StorEdge 3000 Family Release Notes* located at:

`www.sun.com/products-n-solutions/hardware/docs/Network_Storage_Solutions/Workgroup/3310`

APPENDIX **A**

SCSI Array Specifications

This appendix provides the specifications for the Sun StorEdge 3310 SCSI array. The topics covered are:

- “Physical Specifications” on page A-2
- “Summary of Sun StorEdge 3310 SCSI Array Specifications” on page A-3
- “Agency Approvals and Standards” on page A-4

A.1 Physical Specifications

TABLE A-1 Sun StorEdge 3310 SCSI Array Physical Specifications

Description	Desktop	Rackmount
Height	3.64” / 9.25 cm.	2U (3.45” / 8.76 cm.)
Width	19” / 48.26 cm.	17.56” / 44.60 cm. (body)
Depth	Main chassis 18” / 45.72 cm.	Main chassis 18” / 45.72 cm.
	To back of power supply: 20” / 50.8 cm.	To back of power supply: 20” / 50.8 cm.
	To back of power supply handle: 21” / 53.34 cm.	To back of power supply handle: 21” / 53.34 cm.
Weight (fully loaded)	60.0 lbs. / 27.2 kg. with 73GB drives	54.0 lbs. / 24.5 kg. with 73GB drives
Weight (fully loaded JBOD or expansion unit)	57.2 lbs. / 25.9 kg. with 73GB drives	51.2 lbs. / 23.2 kg. with 73GB drives

Note – Add 10.6 lbs. (4.8 kg.) for packaging if you want to know the shipping weight of your array or expansion unit.

A.2 Summary of Sun StorEdge 3310 SCSI Array Specifications

Feature	Description
General	• 12 hot-pluggable drives in a 2U (3.5” high) chassis • Ultra 160 SCSI buses • Autosensing AC or DC power supplies • Dual-host access in certain configurations
Density	• Up to 432 GB in a RAID array • 21 in. chassis depth • RAID supports one expansion chassis in a dual-host configuration, or two expansion chassis in a single-host configuration
Reliability	• Redundant hot swappable FRUs • Single or redundant active/active hot-swappable RAID controllers • Redundant hot swappable event monitoring units (EMU) • N+1 hot swappable power and cooling • NEBS Level 3 and HALT test certified; Designed to meet 99.999% reliability
RAID System Storage Resource Management	• Web-based 10/100BASE-T Ethernet support • Serial port out-of-band support with modem control • RAID Levels 0, 1, 1+0, 3, 5, 3+1, 5+1 • Rolling firmware upgrades (with redundant RAID controllers) • Up to 128 LUNs • SNMP traps and MIB in firmware • 512 MB cache memory standard • Four Ultra160 SCSI channels • User-configurable as drive or host • Support for Sun StorEdge Configuration Service and Diagnostic Reporter management software

A.3 Agency Approvals and Standards

Product Safety	
Country	**Standard**
U.S.	UL Listed to UL60950:2000, 3rd Edition
Canada	CSA Standard CAN / CSA-C22.2 No. 60950-00 3rd Edition
Germany	TÜV
European Union	EN 60950:2000
Japan	Part of World-wide CB Scheme
Australia	Part of World-wide CB Scheme
Argentina	Resolution 92-98 (S-Mark)
Germany	GS mark (ergonomics) (Rheinland)
Russia	Part of World-wide CB Scheme (GOST-R mark)
Russia	Hygienic Mark (ergonomics)

Electromagnetic Compatibility	
Country	**Standard**
U.S.	FCC #47, Part 15, Subpart B, Class B
Canada	ICES-003
Japan	VCCI Class B
European Union	EN 55022:1998 Class B
Australia / New Zealand	AS / NZS 3548:1996
Taiwan	BSMI CNS 13438 Class B
Russia	GOST-R mark
Germany	Same as European Union
Argentina	S mark

Electromagnetic Interference	
Test	**Standard**
Harmonics Emissions	EN 61000-3-2:2000 (No Limits)
Voltage Flicker	EN 61000-3-3:1995 / A1:2001 (No Limits)
ESD	EN 55024 (8kV Contact, 15kV Air)
RF Field	EN 55024 (10V / m)
Electrical Fast Transient Burst	EN 55024 (1kV I / O, 2kV Power)
Surge	EN 55024 (1kV I / O, 1kV Power L-L, 2kV Power L-G)
RF Conducted	EN 55024 (3V I / O and Power)
Power Frequency Magnetic Field	EN 55024 (N / A monitors only)
Voltage Dip and Interruption	EN 55024 (0V / 0.5cycle, 70%V / 0.5sec, 0V / 5sec)

APPENDIX **B**

Cabling JBODs

You can connect a Sun StorEdge 3310 JBOD (Just a Bunch of Disks, no controller) array directly to a host server.

This appendix covers the following topics:

- "A Single-Bus JBOD with One Host Connection" on page B-2
- "A Single-Bus JBOD with Two Host Connections" on page B-3
- "A Dual-Bus, Single Initiator JBOD Configuration" on page B-5

Caution – SCSI IDs are set based on the cabling on the array when it is powered up. If switching from single-bus mode to dual-bus mode or vice versa, the SCSI IDs change after you power off, change the cabling, and then power on. If you change SCSI IDs on the array, ensure that your application points to the correct IDs.

Caution – When you connect or disconnect SCSI cables, the host I/O must be inactive.

Caution – The I/O module is hot-serviceable which means that you can replace it or change its cables while the array is powered on but the SCSI host buses connected to the array must be inactive.

B.1 A Single-Bus JBOD with One Host Connection

To connect a JBOD in a single-bus configuration to a single host, connect the following ports:

- Connect the bottom left input port to the top right port of the JBOD with the SCSI jumper cable.
- Connect the bottom right input port to one host with a SCSI cable.

Caution – BEFORE you disconnect a cable from the array, the host bus on that cable must be inactive.

Caution – SCSI IDs are set based on the cabling on the array when it is powered up. If switching from single-bus mode to dual-bus mode or vice versa, the SCSI IDs change after you power off, change the cabling, and then power on.

Caution – If you change SCSI IDs on the array, ensure that your application points to the correct IDs.

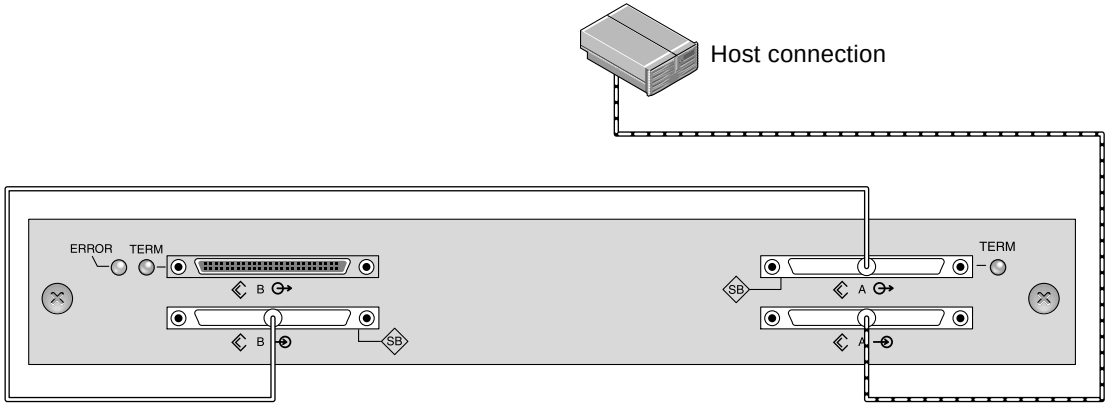


FIGURE B-1 A Single-Bus JBOD with One Host Connection (Rear View)

The following table shows the default SCSI IDs for a 12-drive JBOD when you set up single-bus configuration.

TABLE B-1 SCSI Drive IDs for a JBOD in a Single-Bus Configuration (Front View)

ID 0	ID 3	ID 8	ID 11
ID 1	ID 4	ID 9	ID 12
ID 2	ID 5	ID 10	ID 13

B.2 A Single-Bus JBOD with Two Host Connections

To connect a JBOD in a single-bus configuration to two hosts, connect the following ports:

- Connect the two bottom JBOD input ports with the SCSI jumper cable.
- Connect each top JBOD output port to a host server with a SCSI cable.

Caution – *Before* you disconnect a cable from the array, the host bus on that cable must be inactive.

Caution – SCSI IDs are set based on the cabling on the array when it is powered up. If switching from single-bus mode to dual-bus mode or vice versa, the SCSI IDs change after you power off, change the cabling, and then power on.

Caution – If you change SCSI IDs on the array, ensure that your application points to the correct IDs.

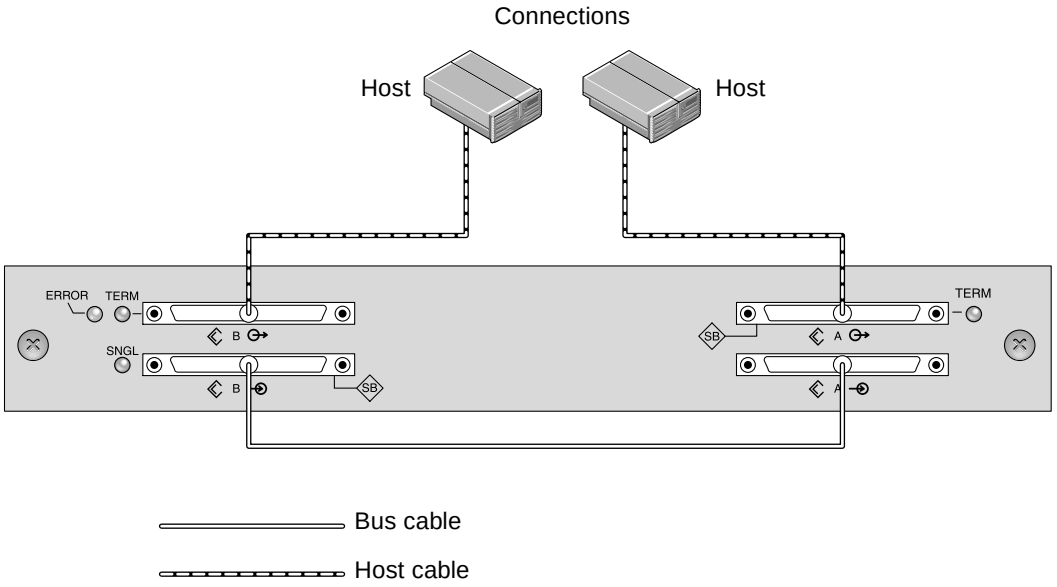


FIGURE B-2 A Single-Bus JBOD with Two Host Connections (Rear View)

The following table shows the default SCSI IDs for a 12-drive JBOD when you set up a single-bus configuration. The SCSI IDs are 0–13, with IDs 6 and 7 reserved for host HBA connections.

TABLE B-2 SCSI Drive IDs for a JBOD in a Single-Bus Configuration (Front View)

ID 0	ID 3	ID 8	ID 11
ID 1	ID 4	ID 9	ID 12
ID 2	ID 5	ID 10	ID 13

B.3 A Dual-Bus, Single Initiator JBOD Configuration

There are two important features to note with the dual-bus, single initiator mode JBOD configuration:

- The bottom input ports on the JBOD must be terminated with an HBA host connection. The upper I/O SCSI connectors are auto-terminated.
- In a dual-bus configuration, the SCSI ID numbers automatically change according to the cabling.

Single initiator mode is when there is only one host connection on a SCSI channel.

Note – Multi-initiator mode is when there are two or more host connections on a SCSI channel; it is not supported at this time.

FIGURE B-3 shows a dual-bus JBOD with two host connections, one host connection to each channel (single initiator mode). This is an efficient way to provide mirroring capability for a single host.

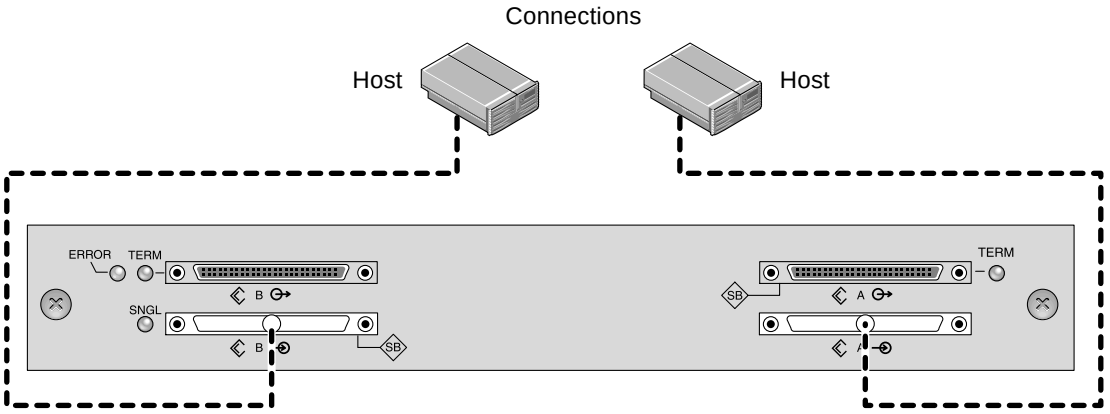


FIGURE B-3 Dual-Bus, Single-Initiator JBOD Configuration

Dual-bus, single initiator mode: SCSI IDs are 8 to 13 on each channel. In the following table, A and B indicate the two different channel numbers assigned by the host, in the dual channel configuration.

TABLE B-3 SCSI Drive IDs for a Dual-Bus JBOD in Single Initiator Mode

Channel A ID 8	Channel A ID 11	Channel B ID 8	Channel B ID 11
Channel A ID 9	Channel A ID 12	Channel B ID 9	Channel B ID 12
Channel A ID 10	Channel A ID 13	Channel B ID 10	Channel B ID 13

To connect a dual-bus JBOD, perform the following steps.

1. **Connect each JBOD port to a host as shown in** FIGURE B-3**.**
2. **Quiesce activity on the host bus connections of any cable you plan to install or remove.**

Caution – The bottom input ports of the JBOD must have a host connection to maintain SCSI bus integrity.

Caution – BEFORE you disconnect a cable from the array, the host bus on that cable must be inactive.

Caution – SCSI IDs are set based on the cabling on the array when it is powered up. If switching from single-bus mode to dual-bus mode or vice versa, the SCSI IDs change after you power off, change the cabling, and then power on.

Caution – If you change SCSI IDs on the array, ensure that your application points to the correct IDs.

Note – For alternate configurations which use an external terminator for special maintenance tasks, refer to the *Sun StorEdge 3000 Family FRU Installation Guide* posted on the product website for the Sun StorEdge 3310 SCSI array. The Sun SCSI LVD / MSE external terminator is part number XTA-3310-SC-TERM.

APPENDIX **C**

Ethernet Connection

This appendix provides Ethernet connection information. Topics covered are:

- "Setting an IP Address" on page C-1
- "Setting Up Out-of-Band Management Over Ethernet" on page C-3

C.1 Setting an IP Address

To set the IP address of the RAID controller, perform the following steps.

1. **Access the Sun StorEdge 3310 SCSI Array RAID controller via a RAID Array COM port.**
2. **On the Main Menu, select "view and edit Configuration parameters."**
3. **Select "Communication Parameters", and then select "Internet Protocol (TCP/IP)."**
4. **Press Return on the chip hardware address, and then select "Set IP Address."**
5. **Type the desired IP address, netmask, and Gateway values.**

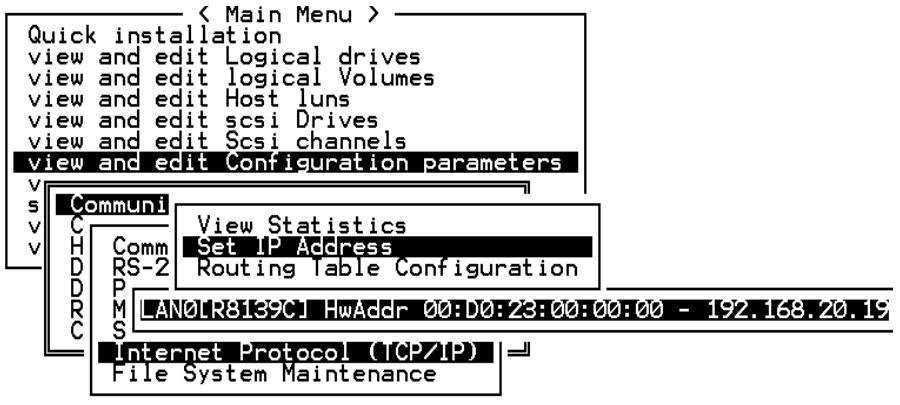


FIGURE C-1 Setting the Controller IP Address

6. **Reset the controller for the configuration to take effect; select “system Functions” from the Main Menu, then select “Reset controller” and press Return. Select Yes and press Return.**

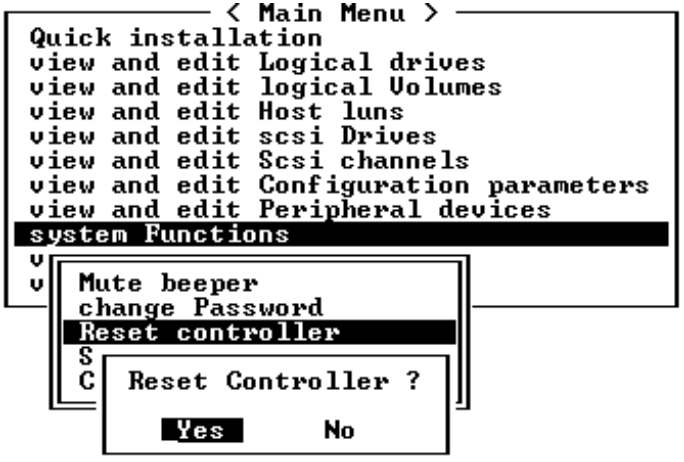


FIGURE C-2 Resetting the Controller

The controller takes a few minutes to format a small storage sector on each physical drive before logical drives can be successfully initialized.

C.2 Setting Up Out-of-Band Management Over Ethernet

1. **To access the RAID Array over an Ethernet connection, first set the IP address of the RAID Array by using the RAID Array COM port and the RAID firmware (refer to “Setting an IP Address” on page C-1).**
2. **Then connect the RAID Array Ethernet port to the network.**
3. **To use the firmware application program from the host server, connect to the IP address of the RAID array controller with the following command:**

```
# telnet IP address
```

Press Ctrl-L to refresh the screen and view the Main Menu.

Note – If you reset the controller during a `telnet` session, you are disconnected from the RAID array and need to use the `telnet` command to log back in to the array.

---

4. **To connect the Sun StorEdge Configuration Service program (on a host server) to a RAID array which has an IP address, refer to the out-of-band management instructions in the** *Sun StorEdge 3000 Family Configuration Service User’s Guide***.**

   In the following network illustration, there are two servers which receive Sun StorEdge Configuration Service Alert messages, and a Sun StorEdge Configuration Service management console which monitors and configures the RAID array as needed.

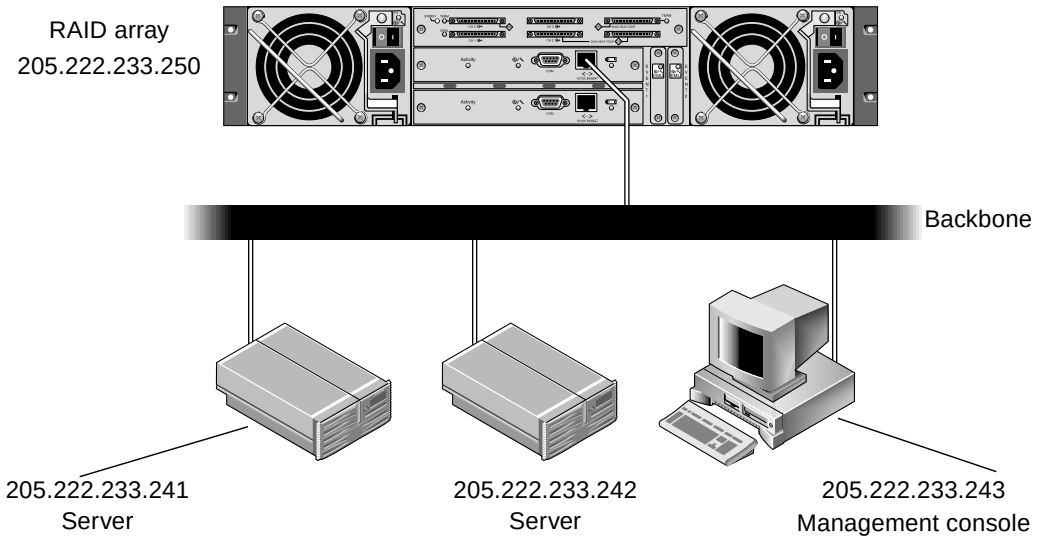


FIGURE C-3 RAID Array 10/100BASE-T Ethernet Port Connected Directly to a Network

APPENDIX **D**

Record of Settings

This appendix provides tables for recording configuration data. Topics covered are:

- "View and Edit Logical Drives" on page D-2
- "Logical Drive Information" on page D-2
- "Logical Drive Partition Information" on page D-3
- "View and Edit Host LUNs" on page D-4
- "LUN Mappings" on page D-4
- "View and Edit SCSI Drives" on page D-5
- "View and Edit SCSI Channels" on page D-6
- "View and Edit Peripheral Devices" on page D-7
- "Save NVRAM to Disk, Restore from Disk" on page D-7

In addition to saving the configuration data in NVRAM to disk, keeping a hard copy of the controller configuration is also recommended. This speeds the recreation of the RAID array in the event of a disaster.

The following tables are provided as a model for recording configuration data.

As a general rule, the configuration data in the NVRAM should be saved to disk or file whenever a configuration change is made.

D.1 View and Edit Logical Drives

D.1.1 Logical Drive Information

LG	ID	LV	RAID Level	Size (MB)	Status	O	#LN	#SB	#FL	Name	Disk Reserved Space

D.1.2 Logical Drive Partition Information

LG	Partition	Size (MB)	LG	Partition	Size (MB)

D.2 View and Edit Host LUNs

D.2.1 LUN Mappings

Host Channel	Pri. / Sec. Controller	SCSI ID	LUN	Logical Drive / Logical Volume	Partition	Size

D.3 View and Edit SCSI Drives

Slot	Chl	ID	Size (MB)	Speed	LG DRV? Global Spare? Local Spare?		Vendor and Product ID

D.4 View and Edit SCSI Channels

Slot	Chl	ID	Size (MB)	Speed	LG DRV? Global Spare? Local Spare?		Vendor and Product ID

Chl	Mode (Host / Drive)	Primary Controller SCSI ID(s)	Secondary Controller SCSI ID(s)

D.5 View and Edit Peripheral Devices

View System Information

Firmware Version

Bootrecord Version

Serial Number

D.6 Save NVRAM to Disk, Restore from Disk

Update Firmware	Date	Save NVRAM to Disk or File	Date/Location	Restore NVRAM from Disk	Date

APPENDIX **E**

Cable Pinouts

This appendix identifies the pinouts for each connector used in the Sun StorEdge 3310 SCSI Array. Topics covered are:

- "SCSI (Host or Drive) Connector" on page E-1
- "RJ-45 Connector" on page E-3
- "DB9 COM port" on page E-4

E.1 SCSI (Host or Drive) Connector

Standard 8mm 68-pin LVD SCSI connector:

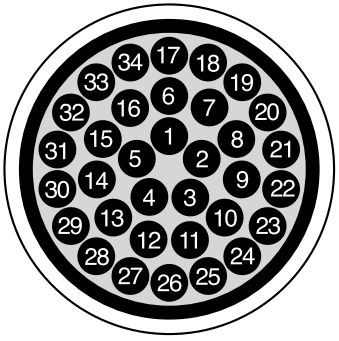


FIGURE E-1 68-Conductor SCSI Pinout for LVD/MSE SCSI

TABLE E-1 SCSI Connector Pin Numbers and Cable Pairs

PIN#	CABLE PAIR SE/LVD	PIN#	CABLE PAIR SE/LVD
1	30SR/+DB12	35	30-DB12/-DB12
2	31SR/+DB13	36	31-DB13/-DB13
3	32SR/+DB14	37	32-DB14/-DB14
4	33SR/+DB15	38	33-DB15/-DB15
5	34SR/+DBP1	39	34-DBP1/-DBP1
6	16SR/+DB0	40	16-DB0/-DB0
7	17SR/+DB1	41	17-DB1/-DB1
8	18SR/+DB2	42	18-DB2/-DB2
9	19SR/+DB3	43	19-DB3/-DB3
10	20SR/+DB4	44	20-DB4/-DB4
11	21SR/+DB5	45	21-DB5/-DB5
12	22SR/+DB6	46	22-DB6/-DB6
13	23SR/+DB7	47	23-DB7/-DB7
14	24SR/+P_CRCA	48	24-DBP/-P_CRCA
15	25GND/GND	49	25GND/GND
16	15DIFFSENSE	50	15GND/GND
17	14TPWR/TPWR	51	14TPWR/TPWR
18	13TPWR/TPWR	52	13TPWR/TPWR
19	12RSVD/RSVD	53	12RSVD/RSVD
20	5GND/GND	54	5GND/GND
21	6SR/+ATN	55	6-ATN/-ATN
22	7GND/GND	56	7GND/GND
23	4SR/+BSY	57	4-BSY/-BSY
24	3SR/+ACK	58	3-ACK/-ACK
25	8SR/+RST	59	8-RST/-RST
26	9SR/+MSG	60	9-MSG/-MSG
27	10SR/+SEL	61	10-SEL/-SEL
28	2SR/+C/D	62	2-C/D/-C/D
29	1SR/+REQ	63	1-REQ/-REQ
30	11SR/+I/0	64	11-I/O/-I/O
31	26SR/+DB8	65	26-DB8/-DB8
32	27SR/+DB9	66	27-DB9/-DB9
33	28SR/+DB10	67	28-DB10/-DB10
34	29SR/+DB11	68	29-DB11/-DB11

*SR=Signal Return, *RSVD=Reserved, *GND=Ground, *TPWR=TERMPWR

E.2 RJ-45 Connector

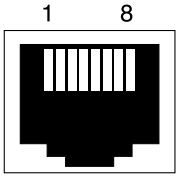


FIGURE E-2 Ethernet RJ-45 Socket 10Base-T

TABLE E-2 Ethernet RJ-45 Pin Description

Pin No.	Description.	Color
1	TX +	White with orange
2	TX –	Orange
3	RX +	White with green
4		Blue
5		White with blue
6	RX –	Green
7		White with brown
8		Brown

E.3 DB9 COM port

The COM port is a female DB9 connector that requires a male DB9 null modem cable.

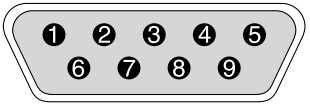


FIGURE E-3 RS-232 DB9 (EIA / TIA 574) View of the Male End

TABLE E-3 Pin Names

Pin No.	Name	Notes/Description
1	DCD	Data Carrier Detect
2	RD	Receive Data (a.k.a. RxD, Rx)
3	TD	Transmit Data (a.k.a. TxD, Tx)
4	DTR	Data Terminal Ready
5	SGND	Ground
6	DSR	Data Set Ready
7	RTS	Request To Send
8	CTS	Clear To Send
9	RI	Ring Indicator

APPENDIX **F**

Configuring a Server Running the Solaris Operating Environment

This appendix provides the following Solaris-specific information:

- "Accessing the Firmware Application From a Host Running the Solaris Operating Environment" on page F-1
  - "Redefining the Baud Rate for the `tip` Command" on page F-2
  - "Using the `tip` Command for Local Access to the Array" on page F-2
- "Editing the sd.conf File" on page F-3
- "Enabling a Host Running the Solaris Operating Environment to Recognize New Devices and LUNs" on page F-5
- "Labeling a Volume" on page F-6
- "Making JBODs Visible to Hosts Running the Solaris Operating Environment" on page F-10

An example `sd.conf` file specifies available host LUN assignments. By default, a Solaris host has only one host LUN per target ID, which typically is not enough LUNs for a Sun StorEdge 3310 SCSI Array.

For your convenience, the procedure on how to label a Solaris volume is also provided.

F.1 Accessing the Firmware Application From a Host Running the Solaris Operating Environment

This section provides information on redefining the baud rate for the serial port connection, and using the `tip` command to access the array remotely.

F.1.1 Redefining the Baud Rate for the `tip` Command

This section describes the method for using the Solaris `tip` command to access the array. Before you can use the `tip` command, you must redefine the baud rate.

The tip command uses the 9600 baud specified in the `/etc/remote` file on the Solaris host by default. The serial port of the array requires 38400 baud so you must edit the `etc/remote` file and revise your use of the tip command, to use the 38400 baud rate.

To edit the `/etc/remote` file for the 38400 baud rate, perform the following steps.

1. **In the** `/etc/remote` **file, copy and edit the** `hardware` **line as follows:**

   Locate:

```
hardware: :dv=/dev/term/b:br#9600:el= . . .
```

   Copy the `hardware` line into a blank line below the `hardware` line, rename the hardware term as `ss3000` and replace `#9600` with `#38400`. The edited line looks like the following line:

```
ss3000: :dv=/dev/term/b:br#38400:el= . . .
```

2. **Save the file in the** `/etc` **directory.**

   Use the replacement term `ss3000` with the `tip` command.

F.1.2 Using the `tip` Command for Local Access to the Array

You can access the RAID COM port (DB9 connector on the controller module) locally with the following commands:

1. **Connect the RAID array COM port to the serial port of a Solaris workstation.**
2. **Use the** `tip` **command to access the array locally:**

```
tip ss3000
cntrl-l (to refresh the screen)
```

F.2 Editing the sd.conf File

Edit the `/kernel/drv/sd.conf` file to add additional targets and LUNs, up to 128 LUNs which can be used in a single Sun StorEdge 3310 SCSI Array. Then reboot the host.

You may want to allow a few extra LUNs for flexibility over the coming months, but generally most administrators minimize the number of unused LUNs because each LUN causes a seven-second delay when you reboot the host.

Note – The maximum number of LUNs per target is 32.

Caution – After you edit `sd.conf`, you must reboot the host to enable the new LUN assignments.

The following example file sets up targets 1 and 3 with a total of 41 LUNs (LUNs 0 through 31 on target 0, and LUNs 0 through 8 on target 3). Default LUNs are listed first, followed by new LUNs.

```
# Copyright (c) 1992, by Sun Microsystems, Inc.
#
#ident"@(#)sd.conf1.998/01/11 SMI"

name="sd" class="scsi" class_prop="atapi"
target=0 lun=0;
.
.
name="sd" class="scsi"
target=15 lun=0;

#NEW LUNs have been appended to the default settings in the file,
starting here.

name="sd" class="scsi"
target=1 lun=1;

name="sd" class="scsi"
target=1 lun=2;

name="sd" class="scsi"
target=1 lun=3;

name="sd" class="scsi"
target=1 lun=4;

name="sd" class="scsi"
target=1 lun=5;

name="sd" class="scsi"
target=1 lun=6;
name="sd" class="scsi"
target=1 lun=7;
.
.
.
name="sd" class="scsi"
target=1 lun=31;
```

```
name="sd" class="scsi"
target=3 lun=1;

name="sd" class="scsi"
target=3 lun=2;

name="sd" class="scsi"
target=3 lun=3;

name="sd" class="scsi"
target=3 lun=4;

name="sd" class="scsi"
target=3 lun=5;

name="sd" class="scsi"
target=3 lun=6;

name="sd" class="scsi"
target=3 lun=7;

name="sd" class="scsi"
target=3 lun=8;


# END additional lun entries
```

F.3 Enabling a Host Running the Solaris Operating Environment to Recognize New Devices and LUNs

You need to edit the `sd.conf` and `/etc/system` files for additional host LUN assignments. By default, a Solaris host is configured for one host LUN per SCSI target which is not enough LUNs for a Sun StorEdge 3310 SCSI array.

1. **Edit the `/kernel/drv/sd.conf` file to add more targets and LUNs (up to 32 LUNs per logical drive, and a maximum of 128 LUNs per Sun StorEdge 3310 array). See the example file "Editing the sd.conf File" on page F-3.**
2. **Add the following line to the `/etc/system` file if you have more than 8 LUNs (any LUNs in addition to LUNs 0 through 7):**

```
set scsi_options=0x43ff8
```

Note – Editing the `/etc/system` file is needed only for onboard host bus adapter connections.

---

3. **Reboot the host to implement the file changes.**

   The Solaris 8 operating environment requires a reconfiguration reboot to create device files and implement `sd.conf` changes but you do not need a reconfiguration reboot for the Solaris 9 operating environment.

```
reboot -- -r
```

   For the Solaris 9 operating environment, use the following commands to create device files after you have edited `sd.conf` and/or the `/etc/system` file. No reboot is necessary with this command:

```
update_drv -f sd
devfsadm
```

   The new LUNs are displayed when you perform the `format` command.

4. **To display the new LUNs, perform the following command:**

```
format
```

F.4 Labeling a Volume

For the Solaris operating environment to recognize a volume, it must be labeled with the `format` command. Whenever you create a volume, label it using the following procedure. For more information on the `format` command, see the `format`(1M) man page.

To label a volume, perform the following steps.

1. **On the data host, type `format` at the root prompt.**

2. **Specify the disk number when prompted.**

   In this example, the array is shown as disk number 2. You can identify it by the SUN-3310-0200 label.

```
format
Searching for disks...done


AVAILABLE DISK SELECTIONS:
       0. c0t2d0 <SUN-3310-0200 cyl 34901 alt 2 hd 128 sec 256>  disk8
          /pci@70,2000/pci@2/SUNW,qlc@4/fp@0,0/ssd@w50020f230000b230,0
       1. c0t2d1 <SUN-3310-0200 cyl 34901 alt 2 hd 128 sec 256>  disk9
          /pci@70,2000/pci@2/SUNW,qlc@4/fp@0,0/ssd@w50020f230000b230,1
       2. c0t4d0 <SUN-3310-0200 cyl 34901 alt 2 hd 128 sec 256>  disk10
          /pci@70,2000/pci@2/SUNW,qlc@4/fp@0,0/ssd@w50020f230000b37f,0
       3. c0t4d1 <SUN-3310-0200 cyl 34901 alt 2 hd 128 sec 256>  disk11
          /pci@70,2000/pci@2/SUNW,qlc@4/fp@0,0/ssd@w50020f230000b37f,1
       4. c0t6d0 <SUN-3310-0200 cyl 34901 alt 2 hd 128 sec 256>  disk12
          /pci@70,2000/pci@2/SUNW,qlc@4/fp@0,0/ssd@w50020f230000b28e,0
       5. c0t6d1 <SUN-3310-0200 cyl 34901 alt 2 hd 128 sec 256>  disk13
          /pci@70,2000/pci@2/SUNW,qlc@4/fp@0,0/ssd@w50020f230000b28e,1
       6. c0t8d0 <SUN-3310-0200 cyl 34901 alt 2 hd 128 sec 256>  disk14
          /pci@70,2000/pci@2/SUNW,qlc@4/fp@0,0/ssd@w50020f230000b719,0
       7. c0t8d1 <SUN-3310-0200 cyl 34901 alt 2 hd 128 sec 256>  disk15
          /pci@70,2000/pci@2/SUNW,qlc@4/fp@0,0/ssd@w50020f230000b719,1
       8. c1t1d0 <SUN-3310-0200 cyl 34901 alt 2 hd 128 sec 256>  disk8
          /pci@71,2000/pci@2/SUNW,qlc@4/fp@0,0/ssd@w50020f230000af55,0
       9. c1t1d1 <SUN-3310-0200 cyl 34901 alt 2 hd 128 sec 256>  disk9
          /pci@71,2000/pci@2/SUNW,qlc@4/fp@0,0/ssd@w50020f230000af55,1
      10. c1t3d0 <SUN-3310-0200 cyl 34901 alt 2 hd 128 sec 256>  disk10
          /pci@71,2000/pci@2/SUNW,qlc@4/fp@0,0/ssd@w50020f230000afdf,0
      11. c1t3d1 <SUN-3310-0200 cyl 34901 alt 2 hd 128 sec 256>  disk11
          /pci@71,2000/pci@2/SUNW,qlc@4/fp@0,0/ssd@w50020f230000afdf,1
      12. c1t5d0 <SUN-3310-0200 cyl 34901 alt 2 hd 128 sec 256>  disk12
          /pci@71,2000/pci@2/SUNW,qlc@4/fp@0,0/ssd@w50020f230000b723,0
      14. c3t2d0 <SUN18G cyl 7506 alt 2 hd 19 sec 248>
          /sbus@7d,0/SUNW,fas@1,8800000/sd@2,0
      15. c3t3d0 <SUN18G cyl 7506 alt 2 hd 19 sec 248>
          /sbus@7d,0/SUNW,fas@1,8800000/sd@3,0
Specify disk (enter its number): 2
selecting c0t4d0
[disk formatted]
```

If the volume had not been labeled previously using the format command, the following confirmation prompt is displayed:

```
Disk not labeled. Label it now?
```

3. **(Optional) If you see this confirmation prompt, type y and press Return to display the FORMAT MENU.**

   The `FORMAT MENU` is displayed.

4. **Type** `type` **to select a drive type:**

```
FORMAT MENU:
        disk       - select a disk
        type       - select (define) a disk type
        partition  - select (define) a partition table
        current    - describe the current disk
        format     - format and analyze the disk
        repair     - repair a defective sector
        label      - write label to the disk
        analyze    - surface analysis
        defect     - defect list management
        backup     - search for backup labels
        verify     - read and display labels
        save       - save new disk/partition definitions
        inquiry    - show vendor, product and revision
        volname    - set 8-character volume name
        !<cmd>     - execute <cmd>, then return0
        quit
format> type
```

5. **Type** `0` **to choose the** `Auto configure` **option.**

   Select the `Auto configure` option regardless of which drive types are displayed by the `type` option.

```
AVAILABLE DRIVE TYPES:
        0. Auto configure
        1. Quantum ProDrive 80S
        2. Quantum ProDrive 105S
        3. CDC Wren IV 94171-344
        4. SUN0104
        5. SUN0207
        6. SUN0327
        7. SUN0340
        8. SUN0424
        9. SUN0535
        10. SUN0669
        11. SUN1.0G
        12. SUN1.05
        13. SUN1.3G
        14. SUN2.1G
        15. SUN2.9G
        16. SUN-3310-0100
       17. other
Specify disk type (enter its number)[16]: 0
c1t1d0: configured with capacity of 33.34GB
<SUN-3310-0200 cyl 34145 alt 2 hd 16 sec 128>
selecting c1t1d0
[disk formatted]
```

6. Type `label` **and answer** `y` **when prompted to continue.**

```
format> label
Ready to label disk, continue? y
```

Note – For further information on partitioning, see the Solaris `format`(1M) man page.

F.5 Making JBODs Visible to Hosts Running the Solaris Operating Environment

If the JBOD cabling is correct and the drives are still not visible, run the `devfsadm` utility to rescan the drives. The new disks can be seen when you perform the `format` command.

If the drives are still not visible, reboot the host(s) with the `reboot -- -r` command so that the drives are visible to the host.

APPENDIX **G**

Configuring a Windows 2000 Server

This appendix provides platform-specific host installation and configuration information to use when you connect a Sun StorEdge 3310 SCSI array to a host running the Windows 2000 Server operating system.

The Sun StorEdge 3310 SCSI Array supports Microsoft Windows 2000 Server and Microsoft Windows 2000 Advanced Server, Service Pack 3 or greater, in dual path configurations using Sun StorEdge Traffic Manager 3.0 failover drivers for Microsoft Windows 2000.

If you are going to use dual path instead of single path, refer to the *Sun StorEdge Traffic Manager 3.0 Installation and User's Guide for Microsoft Windows 2000 and Windows NT* for detailed instructions about setting up the device driver on the server and for additional information about configuring your Windows 2000 Server or Advanced Server.

Customers interested in Sun StorEdge Traffic Manager 3.0 for Multi-Platform support should contact Sun Sales or visit `http://www.sun.com/sales.`

For more information on Multi-Platform support see:
`http://www.sun.com/storage/san/multiplatform_support.html.`

The information in this appendix supplements the configuration steps presented in Chapter 5, and covers the following steps:

- "Setting Up the Serial Port Connection" on page G-2
- "Accessing the Firmware Application From a Windows 2000 Server" on page G-5
- "Enabling a Windows 2000 Server to Recognize New Devices and LUNs" on page G-5

G.1 Setting Up the Serial Port Connection

The RAID controller can be configured by means of a host system running a VT100 terminal emulation program or by a Windows terminal emulation program such as HyperTerminal.

Note – You can also monitor and configure a RAID array over an IP network with the Sun StorEdge Configuration Service program after you assign an IP address to the array. For details, refer to Appendix C, "Ethernet Connection" on page C-1 and to the *Sun StorEdge 3000 Family Configuration Service User's Guide.*

---

1. **Use a null modem serial cable to connect the COM port of the RAID array to an unused serial port on your host system.**

   A null modem cable has serial signals swapped for connecting to a standard serial interface.

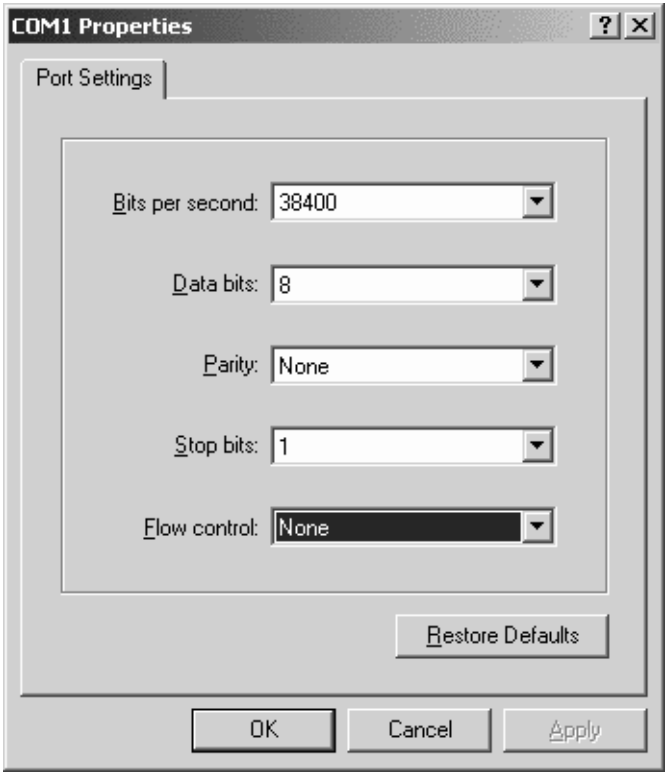
Note – A DB9-to-DB25 serial cable adapter is included in your package contents to connect the serial cable to a DB25 serial port on your host if you do not have a DB9 serial port.

---

2. **Power up the array.**
3. **On the Windows 2000 server, select Start → Programs → Accessories → Communications → HyperTerminal.**
4. **Type a name and choose an icon for the connection.**
5. **In the Connect To window, choose the COM port from the Connect Using: drop-down menu that is connected to the array.**

6. **Click OK.**

7. **In the Properties window, set the serial port parameters using the drop-down menus.**
   - 38400 baud
   - 8 bit
   - 1 stop bit
   - Parity: None
   - Flow control: None



8. **To save the connection and its settings, select File → Save.**

   The connection filename is *connection_name* where *connection_name* is the name you gave this HyperTerminal connection when you created it.

9. **To make a connection shortcut on your desktop, select Start → Find → For Files or Folders. Enter the** *connection_name* **and click the Search Now button. Highlight and right-click on the filename in the Search Results window, select Create Shortcut, and click Yes.**

   You are now ready to configure your array.

G.2 Accessing the Firmware Application From a Windows 2000 Server

To access the array from a Windows NT Server through a serial port, use the HyperTerminal connection you configured in “Setting Up the Serial Port Connection” on page G-2 or install a VT100 terminal emulation program and use the parameters described there.

To access the array through an Ethernet connection, follow the procedures in Appendix C, “Ethernet Connection” on page C-1. To access the command prompt described there from a Windows 2000 server, follow these steps:

1. **Choose Programs from the Start menu.**
2. **Choose Accessories from the Programs menu.**
3. **Choose Command Prompt from the Accessories menu.**

G.3 Enabling a Windows 2000 Server to Recognize New Devices and LUNs

Before beginning this procedure, make sure that you are using a supported SCSI host bus adapter (HBA) such as an Adaptec 39160. Refer to the Release Notes for your array for current information about which HBAs are supported.

Also make sure that you are using a supported driver for your HBA. For the Adaptec 39160, use FMS V4.0a or later.

1. **Boot your system and verify that the host bus adapter (HBA) basic input/output system (BIOS) recognizes your new SCSI device(s).**

Note – While your system is starting up you should see your new SCSI device(s).

---

2. **If a Found New Hardware Wizard is displayed, click Cancel.**

   You are now ready to format your new device(s).

3. **Open the Disk Management folder.**

   a. **Right-click on the My Computer icon to display a pop-up menu.**

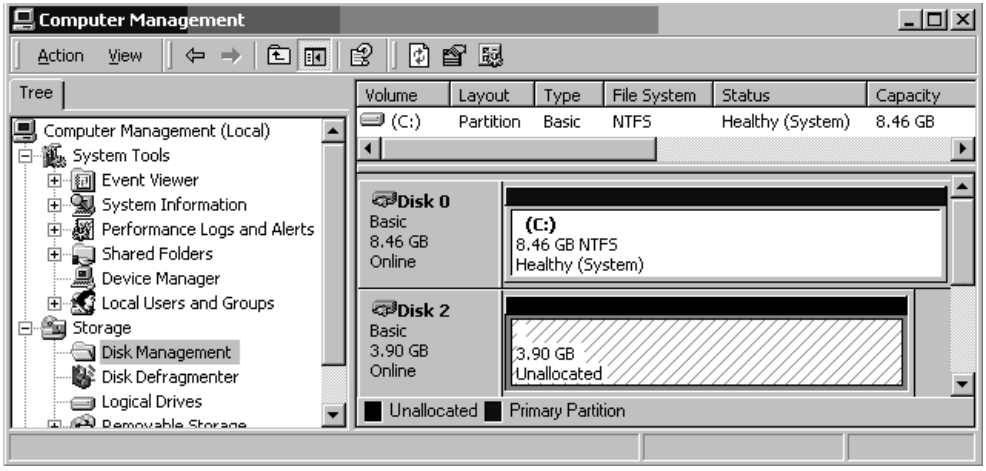
b. Select Manage.

c. Select the Disk Management folder.

d. If a Write Signature and Upgrade Disk Wizard is displayed, click Cancel.

A "Connecting to Logical Disk Manager Server" status message is displayed.

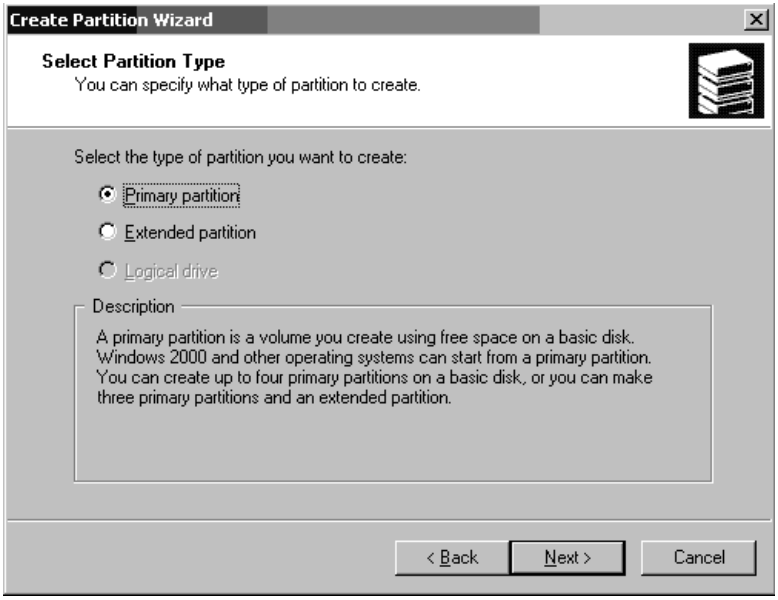
4. Select your new device when it is displayed.



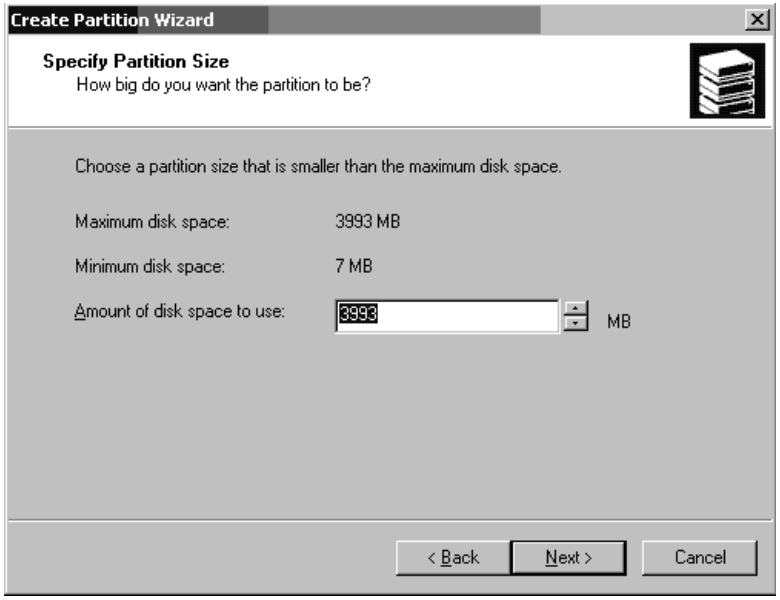
5. Right-click in the Unallocated partition of your device to display a pop-up menu.

6. Select Create Partition from the pop-up menu.

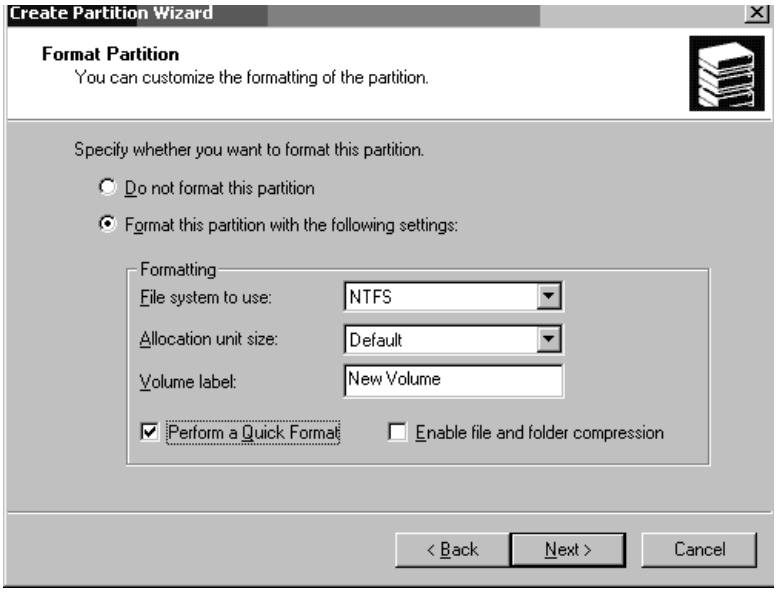
A Create Partition Wizard is displayed.


Create Partition Wizard
Select Partition Type
You can specify what type of partition to create.
Select the type of partition you want to create:
Primary partition
Extended partition
Logical drive
Description
A primary partition is a volume you create using free space on a basic disk. Windows 2000 and other operating systems can start from a primary partition. You can create up to four primary partitions on a basic disk, or you can make three primary partitions and an extended partition.
< Back
Next >
Cancel

7. **Click Next.**
8. **Select Primary partition and click Next.**
9. **Specify the amount of disk space to use or accept the default value, and click Next.**

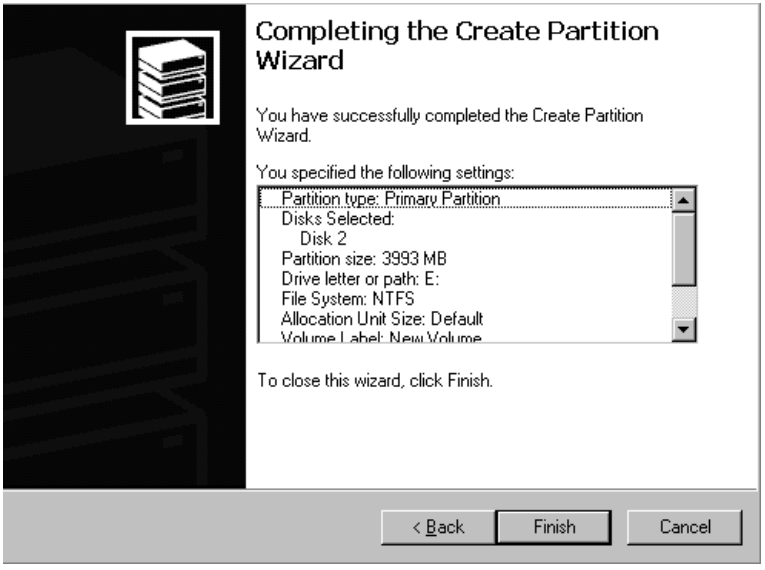


10. **Assign a drive letter if desired and click Next.**
11. **Select Format this partition with the following settings.**
    a. **Specify NTFS as the File system to use.**
    b. **Make sure the Perform a Quick Format checkbox is checked.**



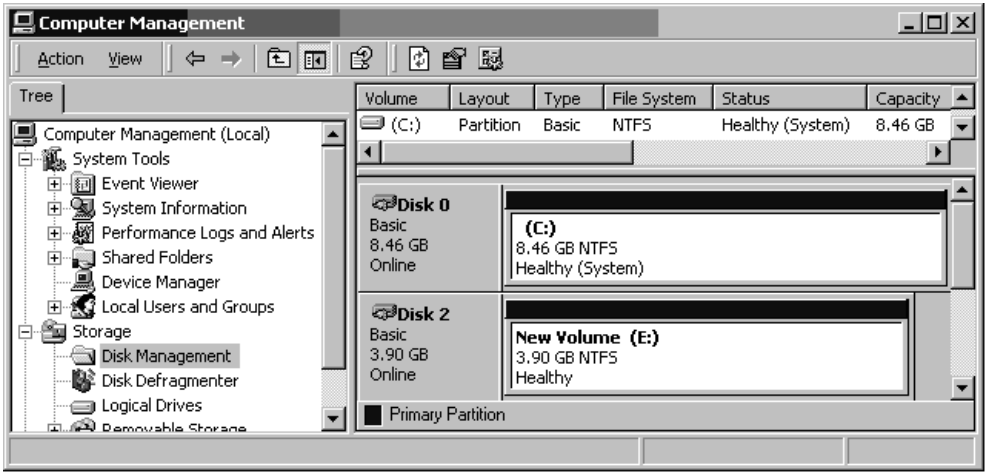
c. Click Next.

A confirmation dialog displays the settings you have specified.



12. Click Finish.

The new partition is formatted and the formatted partition is identified as NTFS in the Computer Management window.



13. Repeat these steps for any other new partitions and devices you want to format.

APPENDIX **H**

Configuring a Linux Server

This appendix provides LUN setup information needed when you connect a Sun StorEdge 3310 SCSI array or a Sun StorEdge 3310 FC array to a Linux operating environment. For a list of supported adapters, refer to the Release Notes of each array.

This information supplements the configuration steps presented in the *Sun StorEdge 3000 Family Installation, Operation, and Service Manual* and covers the following steps:

- "Checking the Adapter BIOS" on page H-1
- "Multiple LUN Linux Configuration" on page H-2
- "Making an ext3 Filesystem for Linux" on page H-3
- "Creating a Filesystem" on page H-4
- "Creating a Mount Point and Mounting the Filesystem Manually" on page H-4
- "Mounting the Filesystem Automatically" on page H-5

H.1 Checking the Adapter BIOS

When booting the server, watch for the host bus adapter (HBA) card BIOS message line to show up and then press the proper sequence of keys in order to get into the HBA BIOS: Key strokes for SCSI Adaptec cards = `<Ctrl><A>`

The key strokes are listed on the screen when the adapter is initializing. After you enter the Adaptec HBA BIOS with `<Ctrl><A>`, perform the following steps.

1. **Highlight** `Configure/View Host Adapter Settings` **and press Return.**
2. **Go to** `Advanced Configuration Options` **and press Return.**
3. **Go to** `Host Adapter BIOS` **and press Return.**
   a. **Select** `disabled:scan bus` **if this is not going to be a bootable device.**

b. If it is going to be bootable device, select the default `Enabled`**. The** `*` **represents the default setting.**

4. **Press** `Esc` **until you get back to the main** `options` **screen where** `Configure/View Host Adapter Settings` **was located.**

5. **Highlight** `SCSI Disk Utilities` **and press Return.**

   The BIOS scans the SCSI card for any SCSI devices attached to the HBA.

   The HBA's SCSI ID is displayed, as well as any other SCSI devices attached to the HBA. If you see only the HBA's SCSI ID, then something is not correct with the configuration on the SCSI attached device, or the cable between the HBA and the SCSI device is bad or not attached.

6. **If you are satisfied with the configuration, press** `Esc`.

   A confirmation prompt asks you if you want to exit the utility.

7. **Select Yes nd press Return.**

   A confirmation prompt is displayed:

```
Please press any key to reboot.
```

8. **Press any key.**

   The server reboots.

   Repeat this procedure for every HBA that is going to be attached to the Sun StorEdge 3000 Family SCSI arrays.

H.2 Multiple LUN Linux Configuration

By default, the Linux kernel does not support multiple LUNs. To support multiple LUNs, modify the kernel with the following steps.

1. **Log in as root, or** `su` **to root if you are logged in as a user.**

2. **Add this line to the end of** `/etc/modules.conf` **file and save the file.**

```
options scsi_mod max_scsi_luns=255
```

3. **At the system prompt, enter this command and press Return:**

```
mkinitrd -f /boot/initrd-2.4.9-e.3.img 2.4.9-e.3
```

The 2.4.9-e.3 entries refer to the current kernel. To find out your current kernel, type `uname -r` and substitute your kernel information in place of the 2.4.9-e.3 entries.

4. **Reboot the server.**

To halt the server completely, use `shutdown -h`. To reboot automatically after the shutdown is complete, use `shutdown -r`.

H.3 Making an ext3 Filesystem for Linux

The following procedure to label and partition drives using `fdisk` applies to an ext3 filesystem. To discover which disk you want to label, you need to find out what device it is.

1. **To list all devices and their paths, start a terminal session and type:**

```
fdisk -l
```

Record the device name(s) and path(s) which you plan to use.

2. **Then type:**

```
fdisk /dev/sd(x) x= a,b,c,...
```

A banner appears for the specified array device. The last statement displays a prompt Command (m or help):

3. **Type *m* or *help*.**

4. **On the displayed menu, select `n` for the `Command action` and press Return.**

Two choices are displayed:

e extended

p primary partition (1-4)

Only four primary partitions are allowed per array. All additional partitions must be added as extended LUNs under one primary partition. Only one primary partition is allowed to have extended LUNs.

5. **For the first partition, choose** `p`**.**

   When several options appear, keep the defaults. You can reconfigure this after you understand the process and see what it looks like. Add additional primary partitions and extended partitions as needed.

6. **After you have completed accepting the defaults and are back at the** `Command (m or help):` **screen, press** `w` **to save the configuration and exit** `fdisk`**.**

   Your partition is ready for a filesystem now.

H.4 Creating a Filesystem

1. **Log in as** `root,` **or** `su` **to root if you are logged in as a user.**

2. **Take the device that you ran** `fdisk` **on and run the following command to create an ext3 filesystem:**

```
mkfs -t ext3 /dev/sdb(x)
```

   where `x` = the partition that you want to have become a filesystem. Replace `x` with `1` since there is only one partition.

H.5 Creating a Mount Point and Mounting the Filesystem Manually

1. **Go to the directory where you want to create a directory to use as the mount point.**

2. **Type this command:**

```
mkdir name
```

3. **To mount your filesystem, type the following:**

```
mount /dev/sdb(x) /directory path
```

   where x = 1 for this partition.

H.6 Mounting the Filesystem Automatically

You can label the partition so that it can be entered in the `fstab` file for mounting the partition automatically at bootup. The use of the label and `fstab` file is a faster operation than mounting the filesystem manually with a device path.

1. **Type the following command to add a label to the partition:**

```
e2label /dev/sdb(x) /(directory path)
```

   where x = 1 for this partition and the directory path is the directory that was created and where it is located.

2. **Edit the `/etc/fstab` file and add the following line:**

```
LABEL=/mount/point /mount/point ext3 1 2
```

3. **Save the file.**

4. **To check to see if `fstab` was set up correctly, type:**

```
mount -a
```

   If the mount point and the `fstab` file are correctly set up, no errors appear.

5. **To verify it is mounted and list all mounted filesystems, type:**

```
df -k
```

6. **To unmount the filesystem, type:**

```
umount /filesystem name
```

APPENDIX I

Configuring an IBM Server Running the AIX Operating Environment

This appendix provides access information and LUN setup information needed when you connect a Sun StorEdge 3310 SCSI array to an IBM server running the IBM AIX operating environment.

For a list of supported HBA adapters, refer to the *Sun StorEdge 3310 SCSI Array Release Notes*.

The Sun StorEdge 3310 SCSI Array supports versions 4.3.3 and 5.1L of the IBM AIX operating environment in dual path configurations using Sun StorEdge Traffic Manager 3.0 failover drivers for IBM AIX.

Refer to the *Sun StorEdge Traffic Manager 3.0 Installation and User's Guide for the IBM AIX Operating System* for detailed instructions about setting up the device driver on the server and for additional information about configuring your IBM server.

Customers interested in Sun StorEdge Traffic Manager 3.0 for Multi-Platform support should contact Sun Sales or visit `http://www.sun.com/sales`.

For more information on Multi-Platform support see:
`http://www.sun.com/storage/san/multiplatform_support.html`.

The information in this appendix supplements the configuration steps presented in this manual and covers the following topics:

- "Setting Up a Serial Port Connection" on page I-2
- "Identifying the Device On Which To Create a Logical Volume" on page I-4
- "Identifying the Device On Which To Create a Logical Volume" on page I-4
- "Using SMIT to Enable an AIX Host to Recognize New LUNs" on page I-5
- "Creating a Volume Group" on page I-6
- "Creating a Logical Volume" on page I-7
- "Creating a File System" on page I-7
- "Mounting the New File System" on page I-8
- "Verifying That the New File System Is Mounted" on page I-9

I.1 Setting Up a Serial Port Connection

The RAID controller can be configured by means of a host system running a VT1000 terminal emulation program or by a Windows terminal emulation program such as HyperTerminal.

If you are planning to access your array over an IP network or through a terminal server and only want to connect through a serial port for the initial configuration of the array, it is not necessary to configure a serial port connection from your IBM host. For convenience, installers frequently perform the initial array configuration using a serial port on a portable computer.

If you want to use a Windows portable computer for this initial array configuration, see “Setting Up the Serial Port Connection” on page G-2 for Windows 2000 systems or “Setting Up the Serial Port Connection” on page K-2 for Windows NT systems.

If you prefer to connect through a serial port on your IBM server, consult the hardware information for your IBM host system to locate a serial port you can use for configuring the Sun StorEdge 3310 SCSI array. The system documentation also tells you what device file to use in accessing that port.

The parameters to use are:

- 38400 baud
- 8 bit
- 1 stop bit
- No parity

Note – The next section also shows how to use the Kermit utility to set these parameters.

Once you have configured your serial port, follow the instructions in the next section.

I.2 Accessing the Firmware Application From an IBM Server Running AIX

The RAID controller can be configured from the host system by means of terminal emulators such as Kermit.

To access the controller firmware through the serial port, perform the following steps.

1. **Connect the serial null-modem cable to the disk array and to the serial port on the IBM server.**

Note – A DB9-to-DB25 serial cable adapter is shipped with the disk array to connect the serial cable to a DB25 serial port on your host if you do not have a DB9 serial port.

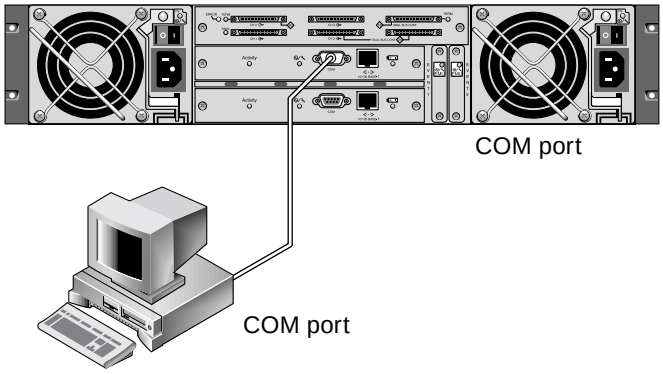


FIGURE I-1 RAID Array COM Port Connected Locally to the Serial Port of a Host System

2. **Power on the array.**
3. **After the array is powered up, power on the IBM server and log in as** `root`**, or** `su` **to** `root` **if you are currently logged in as a user.**
4. **Start the Kermit program and set the parameters as shown in the following example. Use the device-specific name for the serial port you are using. In the example, the serial port being configured is** `/dev/tty0p1`**.**

```
# kermit
Executing /usr/share/lib/kermit/ckermit.ini for UNIX...
Good Morning!
C-Kermit 7.0.197, 8 Feb 2000, for HP-UX 11.00
 Copyright (C) 1985, 2000,
  Trustees of Columbia University in the City of New York.
Type ? or HELP for help.
(/) C-Kermit>set line /dev/tty0p1
(/) C-Kermit>set baud 38400
/dev/tty0p1, 38400 bps
(/) C-Kermit>set term byte 8
(/) C-Kermit>set carrier-watch off
(/) C-Kermit>C
Connecting to /dev/tty0p1, speed 38400.
The escape character is Ctrl-\ (ASCII 28, FS)
Type the escape character followed by C to get back,
or followed by ? to see other options.
----------------------------------------------------
```

Note – To return to the Kermit prompt type Ctrl \ and then C. To exit Kermit, first return to the Kermit prompt and then type `exit`.

I.3 Identifying the Device On Which To Create a Logical Volume

1. **Display all the defined disk devices on your system.**

```
# lsdev -Cc disk
```

A list of defined disk devices is displayed along with information about those devices.

2. **Identify the name of the device on which you want to create a logical volume; for example,** `hdisk7`.

3. **Verify that the disk you've identified is the one you want.**

```
# lscfg -v -l devicename
```

Detailed information about the device you specified is displayed.

4. **Examine the manufacturer information and model information to make sure you have specified the device you want.**

I.4 Using SMIT to Enable an AIX Host to Recognize New LUNs

The simplest way to configure your IBM AIX host to use your array is to use System Management Interface Tool (SMIT). SMIT can be used with a graphical user interface (GUI) if your host is configured with a graphics card or if you want to export your display to an X-Windows terminal. SMIT can also be used with an ASCII interface which can be accessed through an ASCII terminal or console window on another system on the network. Because the ASCII interface is available on all systems, it is used as an example in the remainder of this appendix, but either interface can be used to perform the procedures described here. In addition, the same operations can be performed directly from the command line using standard AIX system administration commands.

Note – Use the Enter key when you have finished filling out a screen to advance to the next screen. Use the keystroke combinations shown on the screen to move back to previous screens.

---

1. **Start SMIT using the ASCII interface to display the System Management screen.**

```
# smit -a
```

2. **Choose System Storage Management (Physical and Logical Storage) from the System Management menu.**

3. **Choose Logical Volume Manager from the System Storage Management menu.**

The Logical Volume Manager menu is displayed on the Logical Volume Manager screen. You use menu options from this menu to create a Volume Group and then a Logical Volume within this Volume Group.

```
Logical Volume Manager
Volume Groups
Logical Volumes
Physical Volumes
Paging Space
```

Volume Groups are a way of dividing and allocating disk storage capacity. Volume groups can be used to subdivide a large partition of storage into smaller units of usable space called logical volumes.

Each volume group is divided into Logical Volumes, which are seen by applications as individual disks. Logical Volumes can contain their own file systems.

The underlying physical storage in a volume group consists of one or more Physical Volumes. A physical volume can be a single physical disk or a partition of a disk array. In this appendix, the physical volume is the disk device you identified in “Identifying the Device On Which To Create a Logical Volume” on page I-4.

I.5 Creating a Volume Group

1. **Choose Volume Group from the Logical Volume Manager menu.**
2. **Choose Add a Volume Group from the Volume Groups menu.**
3. **Type the name you want to give the volume group next to Volume Group name.**
4. **Next to PHYSICAL VOLUME name, type the name of the disk device you identified in “Identifying the Device On Which To Create a Logical Volume” on page I-4.**

   An ARE YOU SURE confirmation screen is displayed.
5. **Confirm this message to display a status screen.**

   When the volume group is created, a status screen displays Command: OK.
6. **Return to the Volume Groups screen to activate the new volume group.**
7. **Choose Activate a Volume Group from the Volume Groups menu.**
8. **Next to VOLUME GROUP name, type the name you gave the volume group.**

   When the volume group is activated, a status screen displays Command: OK.

I.6 Creating a Logical Volume

1. **Return to the Logical Volume Manager screen.**
2. **Choose Logical Volumes from the Logical Volume Manager menu to display the Logical Volumes screen.**
3. **Choose Add a Logical Volume from the Logical Volumes menu to display the Add a Logical Volume screen.**
4. **Type the name you gave the volume group next to VOLUME GROUP name.**

   The Add a Logical Volume screen is displayed.
5. **Type the name you want to give the new logical volume next to LOGICAL VOLUME (new)**
6. **Type the number of partitions you want to create on the new logical volume next to Number of LOGICAL PARTITIONS.**
7. **Type the values you want to use for the other parameters on the Add a Logical Volume screen or accept the default values.**

   When the logical volume is created, a status screen displays Command: OK and displays the name of the new logical volume.

I.7 Creating a File System

The following steps create a file system on the new logical volume.

1. **Return to the System Storage Management (Physical and Logical Storage) screen.**

   The System Storage Management screen is displayed.
2. **Choose File Systems from the System Storage Management menu to display the File Systems screen.**
3. **Choose Add / Change / Show / Delete File Systems from the File Systems menu.**
4. **Choose Journaled File System to display the Journaled File System screen.**
5. **Choose Add a Journaled File System from the Journaled File System menu.**
6. **Choose Add a Standard Journaled File System to display the Volume Group Name screen.**

   The Volume Group Name screen displays the names of available volume groups.

7. **Move the cursor to highlight the name of the volume group you created in "Creating a Volume Group" on page I-6.**

   The Add a Standard Journaled File System screen is displayed.

8. **Specify the size of the file system you want to create by typing the number of blocks you want next to SIZE of file system (in 512-byte blocks).**

9. **Next to MOUNT POINT, type the directory name (and filepath, if desired) on which you want to mount the new file system.**

Note – If the mount point directory does not already exist it is created.

When the file system is created, a status screen displays Command: OK, the Journaled File System, the mount point, and the size of the file system.

I.8 Mounting the New File System

1. **Return to the File Systems screen.**

2. **Choose List All File Systems from the File Systems menu to see the names of all file systems.**

3. **Identify the name of the file system you created in the Name column; for example,** `ldev/lv00`**.**

4. **Choose Mount a File System from the File Systems menu to display the Mount a File System screen.**

5. **Type the name of the file system you identified in step 3 next to FILE SYSTEM name.**

6. **Type the name of the mount point you specified next to DIRECTORY over which to mount.**

   When the file system is mounted, a status screen displays Command: OK.

7. **Exit SMIT.**

I.9 Verifying That the New File System Is Mounted

1. **Use the mount command to verify that the logical volume is mounted correctly.**

```
# mount
```

   The mounted file systems and directories are displayed.

2. **Examine the list to make sure your new file system is mounted at the mount point you specified.**

3. **Display the attributes of the new file system.**

```
# df -k mountpoint
```

APPENDIX **J**

Configuring an HP Server Running the HP-UX Operating Environment

This appendix provides access information and LUN setup information needed when you connect a Sun StorEdge 3310 SCSI array to a computer running the HP-UX operating environment.

For a list of supported host bus adapters, refer to the *Sun StorEdge 3310 SCSI Array Release Notes*.

The Sun StorEdge 3310 FC array supports the HP-UX operating environment Level 11.0 and Level 11.i in dual path configurations using Sun StorEdge Traffic Manager 3.0 failover drivers for the HP-UX operating environment.

Refer to the *Sun StorEdge Traffic Manager 3.0 Installation and User's Guide for the Hewlett Packard HP-UX Operating System* for detailed instructions about setting up the device driver on the server and for additional information about configuring your HP server.

Customers interested in Sun StorEdge Traffic Manager 3.0 for Multi-Platform support should contact Sun Sales or visit `http://www.sun.com/sales`.

For more information on Multi-Platform support see:
`http://www.sun.com/storage/san/multiplatform_support.html`.

The information in this appendix supplements the configuration steps presented in this manual and covers the following topics:

- "Setting Up a Serial Port Connection" on page J-2
- "Accessing the Firmware Application From an HP Server Running HP-UX" on page J-3
- "Attaching the Disk Array" on page J-5
- "Logical Volume Manager" on page J-6
- "Definitions of Common Terms" on page J-6
- "Creating a Physical Volume" on page J-7
- "Creating a Volume Group" on page J-7
- "Creating a Logical Volume" on page J-9

- “Creating an HP-UX File System” on page J-10
- “Mounting the File System Manually” on page J-10
- “Mounting the File System Automatically” on page J-11

J.1 Setting Up a Serial Port Connection

The RAID controller can be configured by means of a host system running a VT1000 terminal emulation program or by a Windows terminal emulation program such as HyperTerminal.

If you are planning to access your array over an IP network or through a terminal server and only want to connect through a serial port for the initial configuration of the array, it is not necessary to configure a serial port connection from your IBM host. For convenience, installers frequently perform the initial array configuration using a serial port on a portable computer.

If you want to use a Windows portable computer for this initial array configuration, see “Setting Up the Serial Port Connection” on page G-2 for Windows 2000 systems or “Setting Up the Serial Port Connection” on page K-2 for Windows NT systems.

If you prefer to connect through a serial port on your HP server, consult the hardware information for your HP host system to locate a serial port you can use for configuring the Sun StorEdge 3310 SCSI array. The system documentation also tells you what device file to use in accessing that port.

The parameters to use are:

- 38400 baud
- 8 bit
- 1 stop bit
- No parity

Note – The next section also shows how to use the Kermit utility to set these parameters.

J.2 Accessing the Firmware Application From an HP Server Running HP-UX

The RAID controller can be configured from the host system by means of terminal emulators such as `cu` or Kermit. These instructions show the use of Kermit. For information on `cu`, see `cu(1)`.

To access the controller firmware through the serial port, perform the following steps.

1. **Connect the serial null-modem cable to the disk array and to the serial port on the HP server.**

Note – A DB9-to-DB25 serial cable adapter is shipped with the disk array to connect the serial cable to a DB25 serial port on your host if you do not have a DB9 serial port.

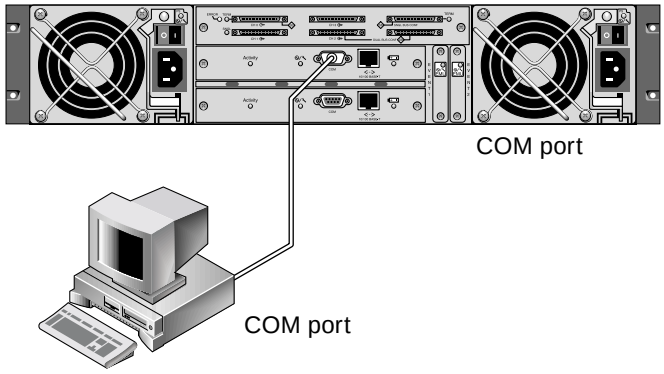


FIGURE J-1 RAID Array COM Port Connected Locally to the Serial Port of a Host System

2. **Power on the array.**
3. **After the array is powered up, power on the HP server and log in as `root`, or `su` to `root` if you are logged in as a user.**
4. **Start the Kermit program and set the parameters as shown in the following example. Use the device-specific name for the serial port you are using. In the example, the serial port being configured is `/dev/tty0p1`.**

```
# kermit

Executing /usr/share/lib/kermit/ckermit.ini for UNIX...

Good Morning!

C-Kermit 7.0.197, 8 Feb 2000, for HP-UX 11.00

Copyright (C) 1985, 2000,

Trustees of Columbia University in the City of New York.

Type ? or HELP for help.

(/) C-Kermit>set line /dev/tty0p1

(/) C-Kermit>set baud 38400

/dev/tty0p1, 38400 bps

(/) C-Kermit>set term byte 8

(/) C-Kermit>set carrier-watch off

(/) C-Kermit>C

Connecting to /dev/tty0p1, speed 38400.

The escape character is Ctrl-\ (ASCII 28, FS)

Type the escape character followed by C to get back,

or followed by ? to see other options.
```

Note – To return to the Kermit prompt type Ctrl \ and then C. To exit Kermit, first return to the Kermit prompt, and then type `exit`.

J.3 Attaching the Disk Array

The simplest way to configure a disk array is to use System Administration Manager (SAM), HP-UX's system administration tool. If SAM is not installed on your system, or if you prefer to use the command-line interface, the following procedures can guide you through the task. For more information please consult the HP document *Configuring HP-UX for Peripherals*:

1. **Use the `ioscan` command to determine what addresses are available on the host bus adapter (HBA) you plan to attach to the Sun StorEdge 3310 SCSI array.**
2. **Access the firmware application on the Sun StorEdge 3310 SCSI array and set the SCSI IDs of the host channels you want to use.**
3. **Map the partitions containing storage that you want to use to the appropriate host channels.**

   Partitions must be assigned to LUNs in sequential order beginning at LUN 0.
4. **Halt the operating system using the `shutdown` command.**
5. **Turn off all power to peripheral devices and then to the server.**
6. **Attach one or more host channels of the Sun StorEdge 3310 SCSI array to the SCSI interface cards in the host using the supplied SCSI cables.**
7. **Turn on the power to the Sun StorEdge 3310 SCSI array and all other peripheral devices.**
8. **After they are initialized, power on the server and boot HP-UX.**

   During the boot process, the operating system recognizes the new disk devices and builds device files for them.
9. **Verify that you can see the new storage resources by running the `ioscan` command. You are now ready to use the storage.**

Note – If you create and map new partitions to the array, you can have them recognized by the operating system without rebooting. Run the `ioscan` and the `insf` commands to discover the resources and to create their device files.

J.4 Logical Volume Manager

The Logical Volume Manager (LVM) is a disk management system provided by HP in all versions of HP-UX 11. The LVM allows you to manage storage as logical volumes.This section describes some concepts used by the LVM and explains how to create logical volumes on your StorEdge 3310 SCSI array. For more detailed information on the LVM, please consult `lvm`(7) and the HP publication *Managing Systems and Workgroups: Guide for HP-UX System Administration* (HP part number B2355-90742).

As with many systems administration tasks you can use SAM to create and maintain logical volumes; however some functions can only be performed with HP-UX commands. The procedures in this appendix are performed using the command line interface rather than using SAM.

J.5 Definitions of Common Terms

Volume groups are HP-UX's method for dividing and allocating disk storage capacity. Volume groups can be used to subdivide a large partition of storage into smaller units of usable space called logical volumes.

Each volume group is divided into *logical volumes*, which are seen by the applications as individual disks. They can be accessed as either character or block devices and can contain their own file systems.

The underlying physical storage in a volume group consists of one or more *physical volumes*. A physical volume can be a single physical disk or a partition of a disk array.

Each physical volume is divided into units called *physical extents*; the default size of these units is 4 MB, but can range in size from 1 MB to 256 MB. The maximum number of physical extents that a volume group can contain is 65,535. With the default size of 4 MB, this limits the size of the volume group to 255 GB.

To create a volume group larger than 255 GB, you must increase the size of the physical extents when creating the volume group. See `vgcreate(1m)` for further information.

J.6 Creating a Physical Volume

To use a storage resource in the LVM, it must first be initialized into a physical volume (also called an LVM disk).

Log in as `root`, or `su` to `root` if you are not logged in with root user privileges.

1. **Select one or more partitions on the Sun StorEdge 3310 that you want to use. The output of `ioscan`(1M) shows the disks attached to the system and their device names:**

```
# ioscan -fnC disk

Class  I   H/W  Path     Driver  S/W State  H/W Type  Description
```

```
disk   1  0/12/0/0.6.0  sdisk   CLAIMED    DEVICE    Sun StorEdge 3310

/dev/dsk/c12t6d2 /dev/rdsk/c12t6d2
```

2. **Initialize each partition as an LVM disk with the `pvcreate` command. For example, enter:**

```
# pvcreate  /dev/rdsk/c12t6d2
```

Caution – This process results in the loss of any data that resides on the partition.

J.7 Creating a Volume Group

The volume group contains the physical resources that you can use to create usable storage resources for your applications.

1. **Create a directory for the volume group and a device file for the group in that directory:.**

```
# mkdir /dev/vgmynewvg

# mknod /dev/vgmynewvg/group c 64 0x060000
```

The name of the directory is the name of the volume group. By default, HP-UX uses names of the format vg*NN*, but you can chose any name that is unique within the list of volume groups.

In the preceding example the `mknod` command has the following arguments:

- The fully qualified pathname of the new device file `group`
- The letter `c` indicates a character device file
- The major number 64 (used for all volume groups)
- A minor number of the form `0x`*NN*`0000`, where *NN* is the two-digit hexadecimal representation of the volume group number (06 in the example)

To associate the physical volume with a volume group use the `vgcreate` command:

```
# vgcreate /dev/vgmynewvg /dev/dsk/c12t6d2
```

To verify the creation and view the volume group properties, use the `vgdisplay` command.

```
# vgdisplay vg02

--- Volumegroups ---

VG Name                 /dev/vg02

VG Write Access         read/write

VG Status               available

Max LV                  255

Cur LV                  0

Open LV                 0

Max PV                  16
```

```
Cur  PV                 1

Act  PV                 1

Max  PE  per  PV        2167

VGDA                    2

PE  Size  (Mbytes)      4

Total  PE               2167

Alloc  PE               0

Free  PE                2167

Total  PVG              0
```

In the output of `vgdisplay`, the Total PE field gives the number of physical extents in the volume group.

The size of each physical extent is given in the PE Size field (the default is 4 MB), so the total capacity of this volume group is 2167 x 4 MB = 8668 MB.

The Alloc PE field shows the numbers of physical extents allocated to logical volumes. At this point, the Alloc PE field is zero because we have not assigned any of this volume group's capacity to logical volumes.

J.8 Creating a Logical Volume

To create a logical volume within the volume group, use the `lvcreate` command with the `-L` option to specify the size of the logical volume in megabytes. The logical volume size should be a multiple of the physical extent size. In the following example, a logical volume of 4092 MB is created:

```
# lvcreate -L 4092 /dev/vg02
```

Both character and block device files for the new logical volume are created in the volume group directory:

```
# ls /dev/vg02

group   lvol1   rlvol1
```

Applications should use these names to access the logical volumes. Unless you specify otherwise, HP-UX creates names in the form shown in the example. To specify custom names for logical volumes please see `vgcreate`(1M).

J.9 Creating an HP-UX File System

The following command creates a file system on the logical volume created in the previous steps.

```
# /sbin/newfs -F vxfs /dev/vgmynewvg/rlvol1
```

J.10 Mounting the File System Manually

The process of incorporating a file system into the existing directory structure is known as mounting the file system. The files, although present on the disk, are not accessible to users until they are mounted.

1. **Create a directory to use as the mount point for your new file system:**

```
# mkdir /usr/local/myfs
```

2. **To mount your file system, type the following:**

```
# mount /dev/vgmynewvg/lvol1 /usr/local/myfs
```

J.11 Mounting the File System Automatically

By placing information about your file system in the `fstab` file, you can have HP-UX mount the file system automatically during bootup. You can also use the name of the mount point in mount commands that you issue from the console.

1. **Make a copy of the existing `fstab` file:**

```
# cp /etc/fstab /etc/fstab.orig
```

2. **To include the file system created in the example, add the following line to the file `/etc/fstab`.**

```
/dev/vg0mynewvg/lvol1 /usr/local/myfs vxfs delaylog 0 2
```

   See the entry for `fstab(4)` for details on creating `/etc/fstab` entries.

3. **To check to see if `fstab` was set up correctly, type:**

```
# mount -a
```

   If the mount point and the `fstab` file are correctly set up, no errors appear.

4. **To verify it is mounted and list all mounted file systems, type:**

```
# bdf
```

5. **To unmount the file system, type:**

```
# umount /usr/local/myfs
```

APPENDIX **K**

Configuring a Windows NT Server

This appendix provides platform-specific host installation and configuration information to use when you connect a Sun StorEdge 3310 SCSI array to a host running the Windows NT 4.0 operating system.

The Sun StorEdge 3310 SCSI Array supports Microsoft Windows NT 4.0, Service Pack 6A or greater, in either single-path or dual-path configurations. Dual-path configurations use the Sun StorEdge Traffic Manager 3.0 for Microsoft Windows NT.

If you are going to use dual path instead of single path, see the *Sun StorEdge Traffic Manager 3.0 Installation and User's Guide for Microsoft Windows 2000 and Windows NT* for detailed instructions about setting up the device driver on the server and for additional information about configuring your Windows NT server.

Customers interested in Sun StorEdge Traffic Manager 3.0 for Multi-Platform support should contact Sun Sales or visit `http://www.sun.com/sales`.

For more information on Multi-Platform support see:
`http://www.sun.com/storage/san/multiplatform_support.html`.

The information in this appendix supplements the configuration steps presented in Chapter 5, and covers the following steps:

- "Setting Up the Serial Port Connection" on page K-2
- "Accessing the Firmware Application From a Windows NT Server" on page K-4
- "Enabling a Windows NT Server to Recognize New Devices and LUNs" on page K-5

K.1 Setting Up the Serial Port Connection

The RAID controller can be configured by means of a host system running a VT100 terminal emulation program or by a Windows terminal emulation program such as HyperTerminal.

Note – You can also monitor and configure a RAID array over an IP network with the Sun StorEdge Configuration Service program after you assign an IP address to the array. For details, refer to Appendix C, “Ethernet Connection” on page C-1 and to the *Sun StorEdge 3000 Family Configuration Service User’s Guide.*

---

1. **Use a null modem serial cable to connect the COM port of the RAID array to an unused serial port on your host system.**

   A null modem cable has serial signals swapped for connecting to a standard serial interface.

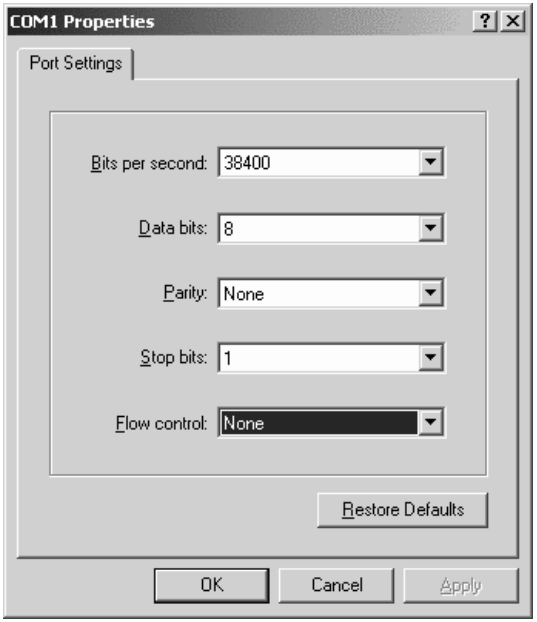
Note – A DB9-to-DB25 serial cable adapter is included in your package contents to connect the serial cable to a DB25 serial port on your host if you do not have a DB9 serial port.

---

2. **Power up the array.**
3. **On the Windows NT server, select Start → Programs → Accessories → Hyperterminal → HyperTerminal.**
4. **Type a name and choose an icon for the connection.**
5. **In the Connect To window, choose the COM port from the Connect Using: drop-down menu that is connected to the array.**

6. **Click OK.**

7. **In the Properties window, set the serial port parameters using the drop-down menus.**
   - 38400 baud
   - 8 bit
   - 1 stop bit
   - Parity: None
   - Flow control: None



8. **Click OK.**

9. **To save the connection and its settings, select File → Save.**

   The connection filename is *connection_name* where *connection_name* is the name you gave this HyperTerminal connection when you created it.

10. **To make a connection shortcut on your desktop, select Start → Find → For Files or Folders. Enter the *connection_name* and click the Search Now button. Highlight and right-click on the filename in the Search Results window, select Create Shortcut, and click Yes.**

    You are now ready to configure your array.

K.2 Accessing the Firmware Application From a Windows NT Server

To access the array from a Windows NT Server through a serial port, use the HyperTerminal connection you configured in “Setting Up the Serial Port Connection” on page K-2 or install a VT100 terminal emulation program and use the parameters described there.

To access the array through an Ethernet connection, follow the procedures in Appendix C, “Ethernet Connection” on page C-1. To access the command prompt described there from a Windows NT server, follow these steps:

1. **Choose Programs from the Start menu.**
2. **Choose Command Prompt from the Programs menu.**

K.3 Enabling a Windows NT Server to Recognize New Devices and LUNs

Before beginning this procedure, make sure that you are using a supported SCSI host bus adapter (HBA) such as an Adaptec 39160. Refer to the Release Notes for your array for current information about which HBAs are supported.

Also make sure that you are using a supported driver for your HBA. For the Adaptec 39160, use FMS V4.0a or later.

1. **Boot your system and verify that the host bus adapter (HBA) basic input/output system (BIOS) recognizes your new SCSI device(s).**

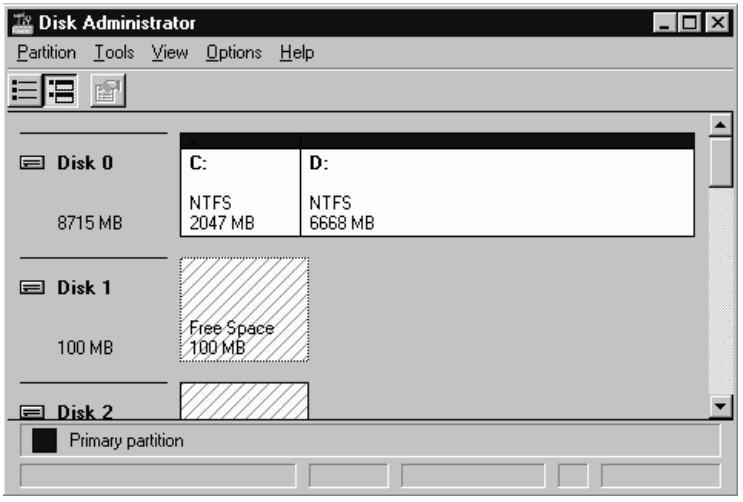
Note – As your system starts up you see your new SCSI device(s).

You are now ready to partition and format your new device(s).

2. **Open the Disk Administrator application.**
   a. **Click Start**
   b. **Choose Administrative Tools from the Programs menu.**
   c. **Choose Disk Administrator.**

      A DIsk Administrator is initializing progress indicator is displayed.

      A Disk Administrator window then displays the drives recognized by the system.
3. **Select the disk whose Free Space you want to partition and format.**



a. Choose Create... from the Partition menu.

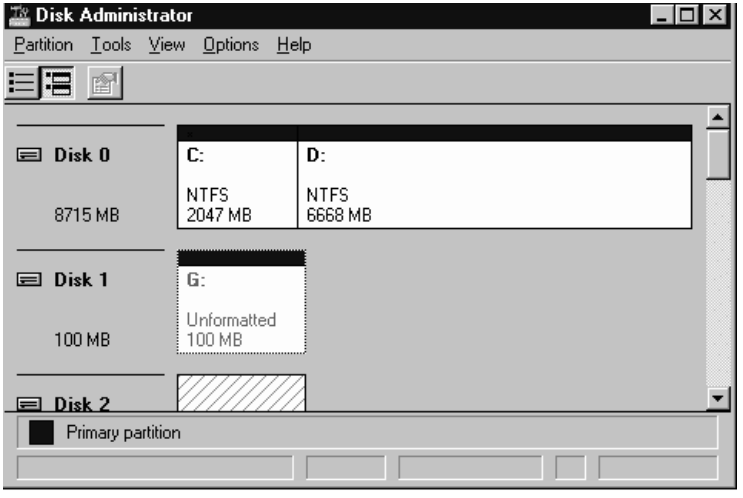
A Create Primary Partition dialog box enables you to specify the size of the partition.

b. Specify a size or accept the default.

c. Click OK to create the partition.

The partition is now identified as Unformatted in the Disk Administrator window.

4. Select the Unformatted partition.



5. **Choose Commit Changes Now... from the Partition menu.**

   A confirmation dialog box is displayed.

6. **Click Yes to save the changes you have made.**

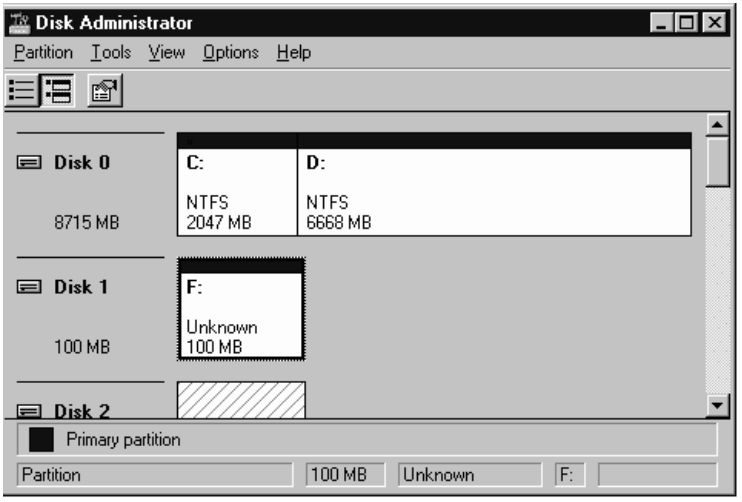
   A dialog box confirms that disks were updated successfully.

7. **Click OK.**

   The partition is now identified as Unknown in the Disk Administrator window.

8. **Format the Unknown partition.**

   a. **Select the Unknown partition.**



   b. **Choose Format... from the Tools menu.**

      A Format dialog box is displayed.

   c. **Choose NTFS from the File System drop-down menu.**

   d. **Make sure the Quick Format checkbox is checked.**

   e. **When you have specified the settings you want, click Start.**

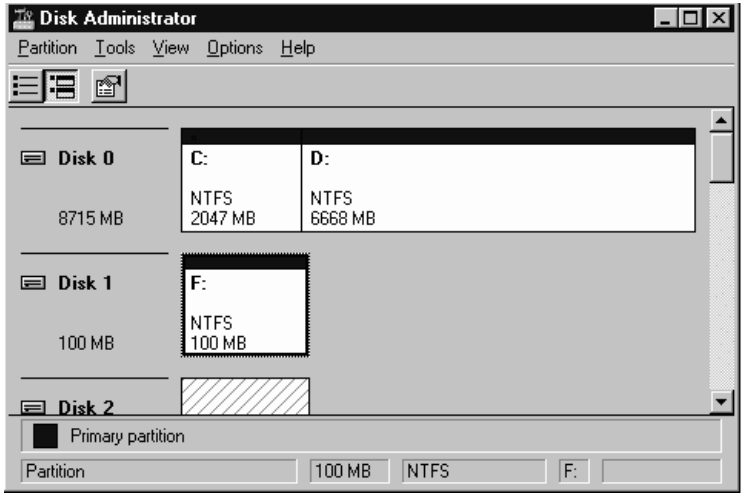
      A dialog box warns you that any existing data on the disk will be erased.

   f. **Click OK to format the disk.**

   The new partition is formatted and a dialog box confirms that the format is complete.

9. **Click OK.**

   The formatted partition is identified as NTFS in the Disk Administrator window.



10. Repeat these steps for any other new partitions and devices you want to format.

APPENDIX L

Installing and Accessing the Command-Line Interface (CLI)

The command-line interface enables you to perform many of the same operations you perform by choosing menu options from the firmware application. CLI commands have the advantage of being scriptable, which is especially useful in large datacenter environments with many arrays that need to be configured similarly.

L.1 Before You Begin

Before you install the CLI utility, make sure that a logical drive is mapped to the primary controller.

L.2 Installing the CLI on Systems Using the Solaris Operating Environment

Obtain the CLI installation package, `SUNWsccli`, from the Sun StorEdge 3000 Family Professional Storage Manager CD. It must be installed on a server that is attached to the array.

1. **Insert the Sun StorEdge 3000 Family Professional Storage Manager CD and type**

```
# pkgadd -d/cdrom/cdrom0/product/solaris SUNWsccli
```

2. **To access the CLI, log in as `root` on the server that you installed the CLI and that is attached to the array, and type**

```
# sccli (with options and subcommands)
```

Note – If you do not have `/usr/sbin` in your PATH environment variable, you can invoke the CLI as `/usr/sbin/sccli`.

L.2.1 Reading the Solaris `sccli`(1M) man Page

Without specifying environment variables, type

```
# man -M /opt/SUNWsscs/man sccli
```

Note – If you do not want to specify the man page directory each time, add the directory `/opt/SUNWsscs/man` to the colon-separated list of directories in the `$MANPATH` environment variable.

L.3 Installing the CLI on Systems Using the Linux Operating Environment

Obtain the CLI installation package, `SUNWsccli.rpm`, from the Sun StorEdge 3000 Family Professional Storage Manager CD. It must be installed on a server that is attached to the array.

1. **Mount the CD-ROM drive on your file system if it is not already mounted.**

```
# mount /dev/cdrom /mnt/cdrom
```

2. **Insert the Sun StorEdge 3000 Family Professional Storage Manager CD and type**

```
# cd /mnt/cdrom/product/linux
```

3. **Type**

```
# rpm -ivh SUNWsccli.rpm
```

4. **To access the CLI, log in as** `root` **on the server that you installed the CLI and that is attached to the array, and type**

```
# sccli (with options and subcommands)
```

L.3.1 Reading the Linux `sccli` man Page

1. **Type**

```
# man sccli
```

L.4 Installing the CLI on Windows NT and Windows 2000 Operating Systems

Obtain the CLI installation package, `SUNWsccli.exe`, from the Sun StorEdge 3000 Family Professional Storage Manager CD. It must be installed on a server that is attached to the array.

1. **Insert the Sun StorEdge 3000 Family Professional Storage Manager CD and change to the** `\product\windows` **directory.**
2. **Double-click** `setup.exe` **and select Sun StorEdge Command-Line Interface**

   The default installation directory is `C:\Program Files\Sun\sccli`.
3. **To access the CLI, go to Start → Programs → Sun StorEdge 3000 Family → Command-Line Interface.**

L.4.1 Reading CLI Help

Go to Start → Programs → Sun StorEdge 3000 Family → Command-Line Help.

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